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An Address
ON
BODY AND MIND:
THE ORIGIN OF DUALISM.

Delivered before the Medical Society of Charing Cross Hospital on Tuesday, Dec. 13th, 1921,

BY SIR FREDERICK MOTT, K.B.E., M.D. LOND., F.R.S.

THE problem of body and mind, or body and soul, is as old as civilisation. The evolution of language has led to a dual terminology, the origin of which I shall point out later. So long as man analyses his own feelings, so long must he use language in order to express to others his thoughts and so long must he have two sides to his nature—a bodily and a mental side; accordingly he is accustomed to accept this duality as obvious. At the present time human beings, with few exceptions, accept this duality of body and mind, and language is accordingly impressed with the idea of dualism, and we should not be understood by the majority of people if a new terminology were invented.

Dualism has been reaffirmed by experimental psychologists of the Wundt school, who have advanced the doctrine of psycho-physical parallelism which teaches that the series of bodily events and the series of psychic events stand in an inseparable correlation to one another; but that body and mind, though existing side by side, are separate. This is really a modification of the pre-established harmony of Leibnitz, which Kant had already expressed in a special form. Now if we inquire into the origin of this dualism which exists in all human beings—savages, primitive people, or cultured people—we shall see that it is centred around death; the evidence of burial rites and customs universal in the bronze and neolithic ages shows that prehistoric man believed in an intangible invisible spirit which left the body at death. The doctrines of the wandering souls of the Egyptians, of the stories of the Old Testament, of Homer, who speaks of life "flitting away like a dream," affirm that the body and soul are separable, are two different things, which during life stand in close connexion with one another, but which are separated at death. There was also the prevalent belief that evil spirits could take up their abode in the body; insanity was thus accounted for, and it appears from a recent letter in the press that there are even doctors of the present day who believe in demonology. I suppose general paralysis of the insane in older days would have been attributed to an evil spirit, but we now know that it is due to the spirochæte of syphilis which has taken up its abode and multiplied in the brain.

It is probable that dream life has played a considerable rôle in the foundation of the belief in a soul which can leave the body and return; for in dreams people are carried away to far distant lands, talk to their friends, see and converse with those long since dead; and a natural inference is that in sleep some spirit leaves the body and wanders away—something invisible which has sensibility, feels, thinks, and acts, the same thing that leaves the body at death. This invisible, intangible something, the soul, is either feared or honoured, and the whole mode of abstract thought of primitive people is centred round this point of view.

The problem of body and mind, and body and soul, was discussed by the ancient philosophers, and it is interesting to observe that the doctrine of Lucretius, based partially on the teaching of Democritus and Leukippos, was monistic. He considered the soul to be the vital impulse of all the organs and tissues of the body. The mind is in the head which directs and controls the whole body. He states that "the mind is begotten with the body, grows up with it, and grows old along with it." There is much truth in this doctrine of Lucretius.

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The furniture of the mind is the memory of experiences and the bonds that united them from infancy onwards. But the inborn characters play a very important part not only in the development of the body, but also in that of the mind. These inborn qualities are psycho-physical energy, educability, imagination, emotivity, temper, and a mental balance which depends upon harmonious interrelation and integration of those qualities of the soil upon which the mind grows up along with the body. The inborn germinal qualities are dependent upon sex, race, and ancestry, and combined impress a personality on every individual which profoundly affects his reaction to environmental influences in response to the three primal instincts of self-preservation, propagation, and the herd instinct of conforming to social customs, traditions, and usages. Galton's inquiry into the history of similar and dissimilar twins showed that mental and bodily resemblances occurred in similar twins, and that whereas dissimilar twins brought up under the same environmental influences remained dissimilar as regards the innate qualities of mentality, similar twins brought up under different environmental influences remained the same. Before considering the mind in relation to the study of the brain in mental deficiency I will give a short description of the history of the brain as the seat of the psyche or soul.

THE BRAIN AND THE PSYCHE.

Aristotle considered that the psyche was in the heart and that the brain was a cooling organ. Hippocrates, the father of medicine, localised the psyche or mind in the brain, and this doctrine was upheld by Galen. Most authorities of the Middle Ages accepted the doctrine of Galen that the brain is the organ of mind or psyche; the Cartesian doctrine—according to which the mind was regarded as an invisible, intangible something inhabiting the body and not to be dissociated from the brain—localised the soul's dwelling place in the hollow spaces (ventricles) of the brain. Descartes, wishing to materialise the soul and being unable wholly to discard the Cartesian doctrine, localised the soul in a small gland, the pineal, situated in the centre of the ventricles. Swedenborg, profiting by the discovery of the compound microscope by Leuwenhoek, localised the psyche in the cells of the great brain (cerebrum); these cells, of which there are millions, he called cerebellula. Then came Gall, who argued that the mind must be in the great brain seeing that man's faculties were so much superior to those of animals, and that the great difference between the brains of men and the brains of animals was in the size of the cerebral hemispheres. He also demonstrated the fact that this part of the brain was diseased and wasted in lunatics and idiots; the remarkable work of Gall is forgotten, and his name is generally associated only with the exploded doctrine of phrenology. In 1876 came the experiments of Fritsch and Hitzig, and later of Ferrier, and the establishment of the doctrine of cerebral localisation; although the clinical observations of Dax and Broca, of Bastian and Wernicke, had demonstrated the fact that injury or disease of the left hemisphere in right-handed persons led to various forms of aphasia according to the seat of the lesion, and Hughlings Jackson by clinical observations had foretold localisation of movements in the cortex. It was hoped that further observations in this direction would lead to the understanding of the higher functions of mind in relation to body.

THE THEORY OF EVOLUTION AND ITS INFLUENCE ON PSYCHOLOGY.

But it was Darwin's theory of evolution and descent of man which revolutionised biological science and led to the greatest advance in our knowledge of body and mind. His theory dispensed with dogma

and tradition, enabling psychology to be placed under the biological sciences, with the result that many of the younger psychologists—especially those who are concerned with the study and treatment of disorders and diseases of the mind—have regarded psychology from a biological point of view. A pioneer in that direction was Henry Maudsley. In support of this view I will quote a passage from the "Descent of Man" (p. 79):—

"It has I think now been shown that men and the higher animals, especially the primates, have some few instincts in common. All have the same senses, intuitions and sensations; similar passions and even the more complex affections and emotions, such as jealousy, suspicion, emulation, gratitude and magnanimity. They practise deceit and are revengeful. They are sometimes susceptible to ridicule and even have a sense of humour. They feel wonder and curiosity; they possess the same faculties of imitation, of attention, deliberation, choice, memory, imagination and association of ideas and reason, though in very different degrees.

The individuals of the same species graduate in intellect from absolute imbecility to high excellence. They are also liable to insanity, though far less often than in the case of man. Nevertheless, many authors have insisted that man is divided by an inseparable barrier from the lower animals by his mental faculties. I formerly made a collection of about a score of such aphorisms, but they are almost worthless, as their wide difference and number prove the difficulty, if not the impossibility, of the attempt. It has been asserted that man is alone capable of progressive improvement. That he alone makes use of tools, of fire, domesticates other animals, or possesses property; that no animal has the power of abstraction or of forming general concepts, or is self-conscious and comprehends itself; that no animal employs language; that man alone has the sense of beauty, is liable to caprice, has the feeling of gratitude, believes in God, or is endowed with conscience."

Darwin says: "I will hazard a few remarks on the more important and interesting of these points." He then gives a number of examples in animals in support of his theory. At the same time he admits freely that no animal is self-conscious, if by this term it is implied that he reflects on such points as whence he comes or whither he will go, or what is life and death, and so forth. But how can we be sure that an old dog with an excellent memory and some power of imagination, as shown by his dreams, never reflects on his past experiences, pleasures, and pains in the chase? This would be a form of self-consciousness. On the other hand, how little can the hard-worked wife of an Australian savage, who uses very few abstract words and cannot count above four, assert her self-consciousness and reflect on the nature of her own existence?

Remarking upon language, Darwin observes that the dog expresses in five or six different barks or tones our cries of pain, fear, surprise, anger—together with their appropriate actions; and the murmurs of a mother to her beloved child are more expressive than any words. Mrs. Leslie Stephen says that a dog does frame a general concept of cats or sheep and knows the corresponding words as well as a philosopher; and the capacity to understand is as good a proof of vocal intelligence, though in an inferior degree, as the capacity to speak. The difference in mind between man and the higher animals, great as it is, is certainly one of degree and not of kind (Darwin).

THE PRIMAL INSTINCTS COMMON TO MEN AND ANIMALS.

There are three primal instincts common to men and animals: self-preservation, propagation, and the herd-instinct; and these three instincts are the springs from which the streams and rivers of mental activity flow. From the biological point of view we must regard the body as a commonwealth of cells which has developed from a single cell—the fertilised ovum. Whether we trace its development ontogenetically or phylogenetically, we see the same order of things—increasing complexity and differentiation of structure and function, which necessitates an increasingly complex harmonious interrelation and integration of function for the commonwealth of the organism. In this respect it is very much like the social organism. This harmonious interrelation is brought about by (1) bio-physical processes in the nervous system, and (2) by bio-chemical processes in the organs and tissues of the body, the products of which are conveyed by the blood and lymph streams. Whereas cerebro-spinal sensorimotor processes can be precise, discriminative, and limited in intensity and duration, and therefore capable of infinite variety and refinement by progressive evolution, the bio-chemical processes—although capable of an extraordinary discriminative sensitivity—must be diffuse in their effects, unless they act indirectly through the nervous system. Although the brain is the organ which stores the memory of past experiences and the bonds that unite and recall them, thereby enabling the individual to adapt himself to environment in the struggle for existence, yet strictly speaking the mind is directly dependent upon the vital activities and harmonious interactions of all the organs and tissues of the body; for of what use would the brain be without the peripheral sense-organs and the nerves which connect them with the brain and spinal cord? These are the avenues of intelligence, as was clearly recognised by Aristotle in his famous dictum: *Nihil in intellectu quod non fuerit prius in sensu*," which would be more correct if *et in motu* were added. But another fundamental function of the brain, besides the life of external relation, is the consciousness of the individual's own personality, his appetites and desires, which are due in great part to the organic and bodily sensibility which without cessation makes him aware of his existence and needs.

THE VITAL IMPULSE.

The vital impulse is in every part of the body, and it is certain that the more active the vital impulse in an organ or structure the greater automatically is the supply of oxygen by the blood. Every particle of the body is as much alive as the whole and possesses a bio-chemical memory. In proof of this we know that immunity against disease is due to the body having once defended itself against the toxins of a pathogenic micro-organism; its tissues are thereby sensitised against this particular poison, so that should the organism again attempt to enter the body the defensive mechanisms are immediately mobilised and the organism destroyed before it can multiply in the body. Still more remarkable is the condition termed anaphylaxis or an acquired hypersensitivity of the organs and tissue of the body against foreign substances, especially proteins. Thus, if horse serum is introduced into the body all the tissues of the body are sensitised to resist this foreign substance; and this sensitivity, which is connected with colloidal changes in the tissues, increases day by day, so that after a week or ten days, especially in certain people with an idiosyncrasy, the introduction of a fresh dose of horse serum produces such an intense colloidal reaction in the tissues that shock, sometimes fatal, may occur.

EVOLUTION OF A SPECIFIC BIO-RHYTHM IN THE NERVOUS SYSTEM.

A physical or chemical stimulus, connected with the primal instincts of self-preservation by the avoidance of pain and the capture of food, of propagation and of the bonds of union of the herd, has continued for countless ages in the process of evolution and survival of the fittest, and a specific bio-rhythm to particular stimuli subserving these primal instincts has become fixed and organised in the bodily structures, especially of the nervous system, constituting thus a physiological basis for instinctive action. Associated with these primal instincts are the primitive emotions, or certain states of feeling and bodily reactions common to men and animals. These instinctive reactions may take place independently of consciousness—e.g., the decerebrate dog will, if it be injured, attempt to run away and it will turn its head round and show anger by exposing its canine teeth. Again, Goltz showed that a dog which had had the whole of its brain cortex removed had completely lost its memory, for it

invariably showed anger at the approach of the man who daily fed it. This same dog also exhibited the emotion of disgust, for nothing would induce it to eat meat made bitter with quinine—not even starvation.

The higher we rise in the evolutional scale the more are these instinctive reactions brought under control by the highest functions of the brain. But Nature is unmindful of the individual and mindful only of the species, and in order that the self-regarding sentiment of man should not outweigh the instinct of propagation has predetermined an urgent desire and attraction to the opposite sex accompanied by intense pleasure in the gratification of the sexual appetite. This desire, upon which so many of our mental activities directly and indirectly depend, is primarily due to the sensitising influence of bodily structures on the brain, and I will now dwell a little more fully upon this point of view regarding body and mind.

The Sexual Hormones in Relation to Body and Mind.—The sexual hormones (from *hormao*, I excite) which determine the mental and bodily characters of the two sexes are produced by special interstitial cells contained in the reproductive organs of the two sexes, and these hormone cells can and do functionally act independently of the germ cells. They exist prior to birth, and having determined the sex characters in the infant male, they soon disappear or pass into a resting stage until puberty, when they reappear and determine the secondary male sexual characters; a complete mental revolution then occurs and a vague longing, followed by an attraction to the opposite sex is determined by the sensitising influence of their internal secretion on the brain. If these cells are destroyed, sexual desire is lost. Many other facts could be quoted to show the profound influence of the internal secretions of the sex glands on mind and body. Another fact which speaks of the intimate relation of the sex organs to mind is the fact that a large proportion of the cases of true insanities or psychoses and psycho-neuroses commence at the times when the sex instinct matures and wanes.

The Endocrine Glands in Relation to Body and Mind.—Again the influence of the secretion of the thyroid gland on the development of the brain is shown by the fact that its absence in the infant is associated with cretinous idiocy. Administration of the gland permits the brain to grow and with it the mind develops. Older people, especially women at the change of life, suffer with a failure of secretion of this gland and a curiously characteristic bodily condition, known as myxœdema, occurs. With this there is a disappearance of the energy substance in the brain cells, and slowness of thought, slowness of speech, and frequently mental disorder. Administration of the gland restores the body and mind if it is not begun too late. Another ductless gland, which is no larger than a bean, seated in a little bony saddle (sella turcica) at the base of the skull, controls the growth of the body and is intimately associated with the reproductive organs. Still another gland, the suprarenal, contains a store of adrenalin which, when it is discharged into the circulation stimulates the sympathetic nerves; automatically, under the exciting influence of the emotions of fear and anger, this substance, so discharged, acts as a powerful defence mechanism in the instinct of self-preservation by causing a rise of the blood pressure, a mobilisation of sugar for the production of energy by the muscles for fight or flight, a stimulation of the heart's action, increase of the blood supply to the muscles, and increased coagulability of the blood, so that wounds are less likely to be fatal. Again, there is an intimate association between the development of the brain and the cortex adrenalis, also between this endocrine organ and the reproductive functions.

I might go on at great length showing the importance of these ductless glands and of the autonomic nervous system in relation to the primal instincts and emotions.

HABITS IN RELATION TO BODY AND MIND.

In daily life human beings are largely occupied in the performance of purposeful habits having their origin in the satisfaction of these primal instincts common to men and animals; they are acquired consciously by imitation or invention, but when perfected the will has merely to initiate the action and the sensorimotor reflex mechanism unconsciously carries on. It may be considered that in the subconscious mind there are a series of reflex patterns which when once started proceed in orderly sequence, the pattern of the last incoming sensory stimuli serving as the pattern of the next coördinating directing motor stimuli. The highest psychic level (consciousness) does not take any active part, but is watchful that the purpose willed is fulfilled; for it exhibits awareness when this series of reflex patterns is interrupted or inefficient. We know from experience how fear and apprehensive self-consciousness may interfere with the efficiency of any habitual action.

THE HERD INSTINCT AND HUMAN PROGRESS.

In proportion to the evolution of society and the progress of civilisation, the social instinct comes to dominate more and more human thought and behaviour. The bond of union whereby the members of the herd are willing to sacrifice individual interest and even life is the primal source of preservation for the herd, and to a certain extent therefore for its individual members. This instinct of the herd is, however, a device of Nature for the preservation of the species. It has played in man a predominant rôle in the evolution of language and abstract thought and the advance thereby of culture and civilisation. The habits, customs, and social usages of the herd dominate human life in thought and behaviour and they serve to control the instincts. Owing to over-population and crowding in cities there has arisen among highly civilised people an increasing tendency to a disharmony between social and physiological conditions regarding the sex instinct and its natural gratification. The correlation of body and mind is conclusively shown by the fact that a complete mental revolution peculiar to each sex occurs in adolescence and with it comes a new and great source of psycho-physical energy, the vital impulse to propagate which the social instinct impelled by the stress of self-preservation is enforced to control by contraceptive methods, or—using Freud's expression—to sublimate, that is, direct into other channels—e.g., religion, art, music, literature, and sport.

The social habits, customs, and usages of the herd were and are still too often based upon tradition and dogma connected with mysticism and beliefs in the supernatural, regarding body and mind and body and soul, and before biological science was illuminated by the theory of evolution, few people ventured to differ from the herd regarding dualism. We now realise that in each individual life the furniture of the mind is the memory of the conscious and unconscious experiences and the bonds that united them. There can be no mind without memory and there can be no memory without body seeing that all psychic processes are dependent upon oxidation processes of a biochemical nature. We cannot separate psychical from physiological processes.

THE PERSONALITY IN RELATION TO DEEP FEELING AND EMOTION.

The Ego is aware of his individual personality by the continuum of subjective feelings arising from the whole body in its relation to its integral parts and as a whole to the external world. All experiences of the Ego, attended by deep feeling and emotional discharge, strike at the very roots of the three primal instincts and the physico-chemical changes therewith reverberate and reverberate in the preorganised emotive subconscious sensori-motor and vegetative systems. These nervous and bio-chemical preorganised mechanisms, which have progressively developed in the animal body as a result of evolution in the long procession of countless ages, have become endowed with a specific bio-rhythm attuned to the primitive self-conservative animal emotions—e.g., anger, fear, disgust, and the tender emotions connected with the sexual instinct. The sentiments and passions which are the outcome of the evolution and interaction of

the primitive emotions with the established bonds of union of the herd are likewise endowed with a specific bio-rhythm. Consequently an experience with an intense emotional tone long after it has left the field of consciousness may be still operating subconsciously by the involuntary and unconscious bodily expression of the emotions exciting the associated subconscious memory of the emotional experience, and this in its turn reacts on the body. A vicious circle is thus established by which we may explain: (1) the perseveration of the hysterical derangements of mind and body caused by emotional shock; and (2) anxiety neuroses with a mental conflict involving a struggle between the instinct of self-preservation and the social instinct of the *amour propre*.

EMOTIONAL SHOCK AND WAR NEUROSES.

Hysterical disabilities afflicted a large percentage of the rank and file of the conscript armies in the Great War. The emotion of fear and the wish to escape an intolerable situation led by auto- and hetero-suggestion to various bodily defensive mechanisms, in the nature of hysterical paralyses, tremors, contractures, mutism, blindness, deafness, and their perseveration. These could be prevented largely by suggestion associated with good discipline, morale, and *esprit de corps*. It was found that the number of cases in a regiment increased enormously where these were absent.

Men who had long suffered with tremors, contractures, paralyses, mutism, and other disabilities which they had come to believe were permanent were sent to me and were cured in a few minutes, a few hours, or a few days by various modes of contra-suggestion and persuasion, and when cured it was astonishing how completely changed was their mental attitude: the trembling, the cold blue hands and feet, the sweating and the anxious facial expression—all signs of the emotion of fear—disappeared upon the bodily recovery and the breaking of the vicious circle. About 95 per cent. of the cases of so-called "shell-shock" were really emotional shock, and only 5 per cent. were due to commotional disturbance produced by proximity to the explosion of a large shell. These were the true shell-shock cases, and if not immediately fatal they recovered as a rule much quicker than the emotional case, for the emotion of fear and the unconscious wish to escape from an intolerable situation was not usually a part of their mental attitude as a soldier.

Officers seldom suffered with these hysterical disabilities which were so common in the men; their nervous disability was usually an anxiety neurosis in which the instinct of self-preservation did not play such a dominant part as it did among the rank and file. An exhausted, irritable nervous system, associated with various forms of bodily derangement—e.g., headache, insomnia, tremors, and disorders affecting one or other of the following systems: cardiac, vaso-motor, respiratory, digestive, genital, and glandular—was the result of a mental conflict in the conscious and the subconscious mind between two primal instincts—self-preservation and the esteem of the herd. In some the fear of death played the more important part. In others it was an altruistic fear connected with responsibility for the lives of the men under their charge, rather than their own self-preservation, which led to the nervous breakdown. Most of those officers who suffered with an anxiety neurosis were troubled with terrifying dreams of their battle experiences; some suffered with a recurring dream in which they lived over again some horrifying or terrifying experience, so vividly that they were afraid to sleep. Some were unable to recall their dreams, but the mental and bodily depression on awaking showed that they had been dreaming of past painful experiences. Many shouted out in their sleep commands to their men, and a few fought or walked in their sleep. The war has shown the great importance of the subconscious mind; but experience has demonstrated the fallacy of the Freudian doctrine that all dreams with fear are related to forgotten sexual experiences causing a mental trauma. Moreover, it has shown that individual self-preservation and a mental conflict arising from fear, associated with this primal instinct, suppresses sexual desire. It is interesting to recall that Shakespeare in Mercutio's description of "Queen Mab" refers to soldiers' dreams; and in Lady Percy's speech to Hotspur attention is drawn to the mental conflict in Hotspur's mind and its interference with his marital duties.

But an individual suffering with an anxiety neurosis, which has its origin in the fear that he has irretrievably lost the esteem of his fellows, may arouse through the herd instinct bodily and mental effects similar to those produced by fear for self-preservation. This fact may be explained by the two instincts having been by evolution attuned to a corresponding specific bio-rhythm in respect to fear.

EVOLUTIONAL LEVELS.

We cannot leave this subject of body and mind without a consideration of the doctrine of Hughlings Jackson's levels. We may consider that there are three evolutional levels in the nervous system, and this hypothesis is supported by comparative anatomy and the effects of functional and organic disease of the nervous system. The lowest level is present in all animals and subserves the primal instincts of self-preservation and preservation of the species; it consists of two parts: (1) The vegetative nervous system, consisting of two systems (*a*) the involuntary autonomic or parasympathetic, and (*b*) the sympathetic, with which are associated the ductless glands, and which controls and directs the bodily needs and functions concerned with gratification of the appetites and desires connected with the instincts of self-preservation and propagation; (2) the protopathic sensorimotor nervous system which controls the reflex activities for protection against pain and injury, including injurious degrees of heat and cold.

The second level is the discriminative sensorimotor level. In the vertebrate series we find two great groups: (*a*) Macrosmatic, in which the nervous structures that are especially developed are those connected with smell and taste; and (*b*) microsmatic, in which the senses of sight, hearing, and touch are especially developed. The archicortex of the cerebral hemispheres is highly developed in the former, the neo-cortex in the latter. The projection centres of these senses are around the primary fissures.

The third highest level is the psychic level in which there is a great development of the cortex of the brain, and which in man far exceeds in development that of the largest anthropoid apes. Pari passu with this great development of the cerebral hemispheres is a bodily development far surpassing in excellence all the lower animals—viz., erect posture—by which the forelimbs are no longer used for progression; and perfection of the hand, whereby it becomes not only the instrument but the instructor of the mind, for guided by vision it is enabled to create and make the most varied mental adjustments to environment and control the forces of nature. By the creation of graphic and articulate language, which have simultaneously progressed, has been built up a great social heritage constituting an endowment to civilised man, whose organ of mind is, however, no larger or heavier, and possibly potentially no better, than that of the man who dwelt in caves 50,000 years ago—whose only common mode of expression was, it may be conjectured, mainly by vocal sounds, gestures, and facial expression, a primitive, universal, emotional language understood by all peoples.

ANATOMICAL SUBSTRATUM OF THE PSYCHIC LEVEL.

Now, in idiots who are incapable of articulate expression and abstract thought we find only the two lower levels properly represented, the development of the anatomical basis of the psychic level—i.e., the millions of cells in the cortex—is arrested in development and we have a condition then of amentia or absence of mind. If we examined sections of the cortex we should find the supragranular layer of pyramids especially affected. This layer, as Bolton

has shown, is developed later than the infra-granular layer. Moreover, I have shown that as you rise in the zoological scale of vertebrates, it is this layer which increases in depth and number of cells.

Simple dementia or loss of mind may be associated with a limited destruction of the anatomical basis of mind—viz., the highest psychic level—and, the two lower levels being more or less intact, the habitual acquired sensorimotor reactions may remain and the individual then may behave as an automaton in response to environmental influences and bodily needs. Every part of the body is represented in all the three evolutional levels and, as Hughlings Jackson taught, the last to come evolutionally is the first to go. The three physiological levels are functionally interdependent. The highest level, upon which awareness and volition depend, is able to act through the second discriminative sensorimotor level to alterations in the streams of sensation coming from the external world; while the third and lowest level evolutionally is concerned with the involuntary vital functions of the body, and therefore constitutes the basic source of the desires and impulses connected with self-preservation and propagation. I have endeavoured in this address to show the inseparability of body and mind, and the importance of the study of biology and bio-chemistry in the study of mind in health and disease.

NOTE ON THE TREATMENT OF TUBERCULOSIS.

BY HENRY SPAHLINGER.

(From the Bacterio-Therapeutic Institute, Geneva.)

MY method of treating tuberculosis is based on two different therapeutic principles according to the nature of the disease. These are (*a*) passive immunisation and (*b*) active immunisation.

Passive Immunisation.

Passive immunisation, or serum treatment, applies to acute cases. It aims at progressive disintoxication, in order to assist the patient's natural defences in accomplishing an important part of their work. The different symptoms of intoxication are due not to varying manifestations of the same toxin, but to different toxins, each of which is separately used in the preparation of a "partial" serum. Some of these toxins are not merely products of secretion, but seem to be actually a means of defence used by the micro-organisms when their existence is endangered. To obtain these toxins in vitro virulent strains must be used, and the cultures stimulated at definite intervals by physico-chemical means, such as variation of temperature, in order to harry the existence of the bacilli and force them to produce some of their poisons.

These various toxins serve for the preparation of the three types of "partial" sera, which together constitute the antituberculosis serum.

1. Antitoxins, obtained by means of several ectotoxins secreted by Koch's bacilli in the culture medium.
2. Anti-endotoxins, obtained by means of poisons derived indirectly from the bacillary bodies.
3. Antibacterial sera, obtained by injecting a horse first with dead and then living microbes, the animal having been previously submitted to a long progressive and intense vaccination.

The proportion of these three types of antibodies present in the combined serum varies according to the type of case under treatment. For pulmonary tuberculosis there must be predominance of antitoxins, for surgical tuberculosis predominance of anti-endotoxins. The treatment of pulmonary tuberculosis requires, in addition, the administration of antitoxins and antibacterial sera against mixed infection. These are prepared from the principal pathogenic germs which grow in the tuberculous lesions of the lungs and aggravate the condition of the patient.

The injections of antibodies are made subcutaneously two or three times a week, sometimes every day, or even several times a day in very acute cases. In abdominal tuberculosis, which often complicates the pulmonary disease, it is advantageous to supplement the injections with doses of antibodies taken by mouth during a period of gastric inactivity. In surgical cases it is desirable to inject directly into the foci—e.g., the glands—wherever this is possible.

The length of the treatment varies according to the gravity of the case and the amount of antibodies administered. The treatment aims at the slow destruction of a part of the tuberculous and mixed infection poisons. It is a generally accepted fact that cases of advanced tuberculosis, in which a fatal prognosis has been given, have sometimes suddenly improved without special treatment and slowly recovered. Hence it appears that human tuberculosis in some cases, unfortunately rare, is spontaneously curable by the patient's own natural defences. By neutralising progressively one only of the dominating poisons it frequently becomes possible to give enough artificial assistance to the natural defences and thus turn the balance towards recovery.

Passive immunity is of very short duration, as heterogeneous antibodies rapidly disappear from the organism. Therefore it is essential for the treatment with antibodies to be continued uninterruptedly until the desired improvement has been obtained. Although a clinical recovery is brought about by the serum, relapse or a re-infection is always possible, because the passive immunisation has not modified the natural resistance of the patient to tuberculous infection. Consequently, the aim of the antitoxic treatment consists only in stopping a rapid development of the disease and in transforming an acute into a chronic one.

Active Immunisation.

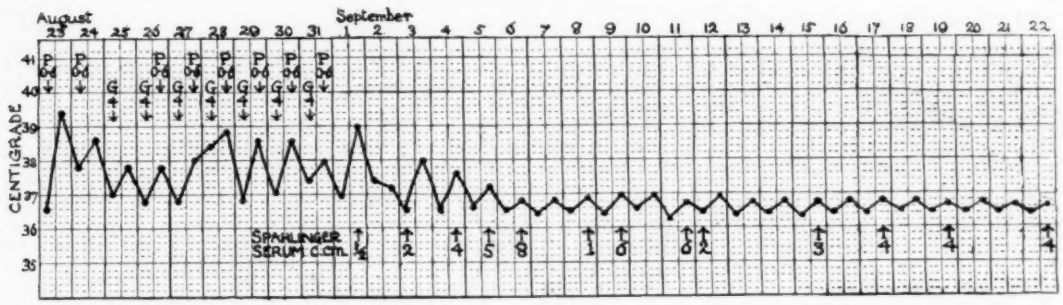
Active immunisation is applicable to cases of chronic afebrile pulmonary tuberculosis, to non-pulmonary forms, and to predisposed cases. It aims at producing an active immunity against the bacilli and at promoting focal reaction. The leading principles of this vaccine treatment are:—

(*a*) To obtain immunity against tuberculosis by means of separate immunities conferred by different components of Koch's bacilli progressively applied. Various antigenic elements of the bacillary protoplasm are injected separately into the patient in order to secure a series of immunities against all the deleterious products of bacterial disintegration. The different vaccines are given progressively in a sequence which will enable the organism to utilise them, not only separately but also consecutively; after a few months' treatment the patient may thus make a complex effort which, initially, might have been impossible for him. The therapeutic results of this anti-tuberculosis vaccine treatment depends upon the sum of the specific active antigenic elements which have been used.

(*b*) The maintenance of the strictest specificity of the antigenic elements. Every alteration of the specificity of the antigens diminishes the efficacy of the vaccines. If the manipulations required in the extraction and preparation of the antigens should seriously modify the nature of the protoplasmic components, as would arise for instance from excess of temperature, the "modified" antigen would provoke in the vaccinated organism antibodies against a "modified" antigen, and not antibodies against a normal antigen similar to the virus which actually has to be fought. It is therefore essential to maintain the greatest specific integrity of the various antigens and to avoid during their preparation all physical or chemical reactions which might alter their nature.

(*c*) The utilisation of the bacillary bodies robbed of their ecto-toxins. Immunisation carried out with ecto-toxins is ineffective against tubercle bacilli themselves. Therefore, admitting the efficacy of an antitoxic immunity, it would leave intact the source of the poisons—the bacilli; against which the human organism should be protected by means of the vaccines.

1



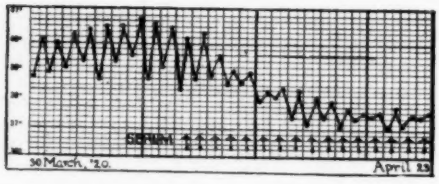
CASE 3.—Pulmonary and abdominal tuberculosis treated with Partial Serum No. C. Prior to its administration antipyretics were being given. P = pyramidin. G = gomenol.

(*d*) The mixture of antibodies with some of the antigens facilitates active immunisation and avoids undesired reactions.

The various antigens are administered in increasing doses up to the maximum dose, which must contain all the active specific elements of the bacillary protoplasm. The sequence of doses varies according to the individuality of the patient, the type and extent of disease, and the reactions provoked. Treatment extends over a period of a few months, usually not more than six. After a first course of vaccines and a period of rest, advanced cases necessitate sometimes a second or complementary antigen treatment in order to consolidate the recovery.

The vaccine treatment should, whenever possible, be carried out in a sanatorium, hospital, tuberculosis dispensary, or by a specialist well acquainted with the technique of active immunisation.

2



CASE 4.—Pulmonary tuberculosis treated with Partial antitoxin.

ILLUSTRATIVE CASES.

The following cases are cited to demonstrate particular points in the treatment:—

Necessity of Employing a Polyvalent Serum.

CASE 1.—Miss H. had been suffering for five years from tuberculous peritonitis. She had been in a sanatorium where she received injections of iodine, paratoxin, Spengler's I.K., Marmorek's serum, all without effect. Spahlinger's *No. 8 partial serum* was administered with rapid disappearance of abdominal pain, cessation of vomiting, fall of temperature to normal, slowing of pulse-rate, improvement in appetite, and increase in weight. Serum No. 8 was stopped after three weeks, and *No. 3 partial serum* employed, with no beneficial results. *Partial serum No. 4* was then tried, the patient gradually becoming worse. A second course of *serum No. 8* produced, as before, marked improvement. *Partial sera Nos. 5 and 22* were then tried with negative results. Later Miss H. was for the third time able to obtain *serum No. 8*, with the result that immediate and lasting improvement took place.

CASE 2.—Mr. R. was an advanced case of pulmonary and abdominal tuberculosis with excessive cough, coloured sputum, hæmorrhages, and tachycardia. Temp. 100°–101°F. T.B. +. Profuse night sweats, considerable emaciation, cachexia, and persistent vomiting. Spahlinger's *sera Nos. 8 and 4* were administered with no beneficial results. *Partial serum No. 3* was next tried, both by injection and by mouth, with cessation of vomiting and pain. Temperature and pulse became normal. Physical signs better. On discontinuing No. 3 all signs of intoxication reappeared. *Partial sera Nos. 6 and 1* then given with no result. A second course of No. 3 produced the former beneficial effect and led to a complete recovery.

The point of interest in the above cases lies in the fact that serum No. 8, which was effective in Case 1, gave no results in Case 2; and that serum No. 3, which cured Case 2, did not benefit Case 1.

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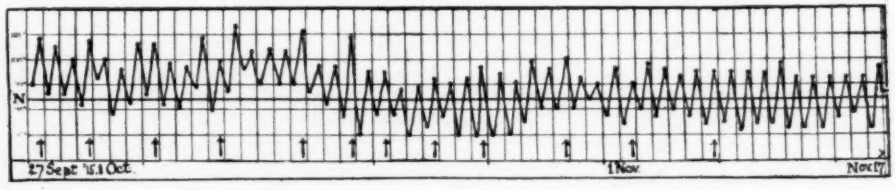

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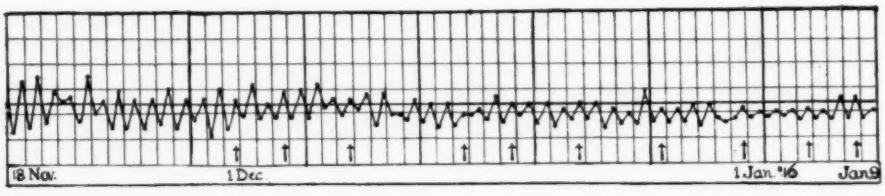

CASE 5.—Pulmonary tuberculosis with complete serum. The arrows indicate the injections of first treatment.

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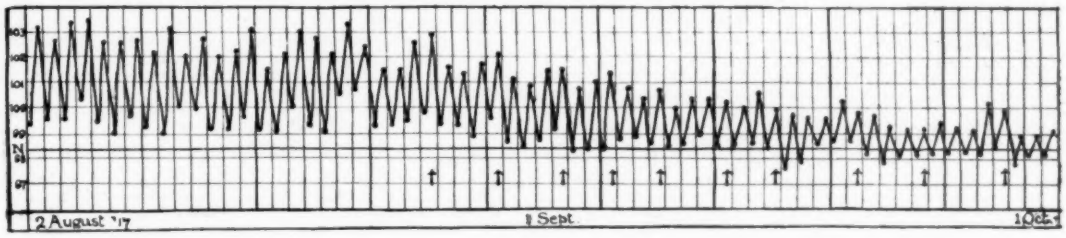

CASE 5.—First relapse and second treatment.

Neutralisation of One Toxin only is often Sufficient to Bring about Complete Recovery.

CASE 3.—(Chart 1). Mr. G. was a case of pulmonary and abdominal tuberculosis. He had had 15 profuse hæmorrhages, the last of which continued for four weeks. Numerous tubercle bacilli were present in the expectoration. Tenderness in the ileo-cæcal region. July: Temp. 104°, profuse fœtid expectoration, highly coloured. Right base completely dull, much congestion. Dyspnœa. August: Cessation of right apex, congestion of left base. September: Persistent fever though pyramidon was administered. Much expectoration, very fœtid. Left apex and base both affected, also the greater part of the right lung. Sept. 1st: Administration of Spahlinger's *partial serum No. C.* Temperature became normal rapidly with great improvement in general condition. Sept. 25th: Physical signs drier, temp. consistently normal. Oct. 22nd: Only a few dry crepitations remaining at left apex, gain in weight, doing exceedingly well. Course of *partial serum No. C* continued until a complete cure was effected.

CASE 4.—MRS. H. (Chart 2 and Fig. 1). October, 1916: Pulmonary tuberculosis diagnosed, went into the country. 1918: To Sabourins sanatorium, T.B. in sputum, temp. 100·4°–100·8° F. Returned to Paris not cured. Lost 11 lb. in one month. To Riviera, gradually getting worse. April, 1919: In bed with temp. 102·4°; hæmoptysis lasting for three weeks. Up for a short period, then returned to bed where she remained until April, 1920, when condition was very critical. Violent and continuous cough, paroxysms lasting for as long as 20 minutes, expectoration green and purulent (350 c.cm. per day). Drenching sweats, extreme emaciation, complete anorexia. Pulse-rate 140, temp. 105·8°, insufferable headaches, delirium; death imminent. April, 1920: intensive Spahlinger treatment. Four injections of *partial antitoxin No. 2* were given per day (morning, noon, afternoon, evening) and 10 c.cm. of serum by mouth 12-hourly. In 15 days the cough had practically ceased. Temp. fell from 105·8° to 99·5°, and the pulse-rate from 140 to 78. Amount of expectoration dropped from 350 c.cm. to three or four daily expectorations. Appetite quickly restored. Night sweats diminished in frequency, but did not entirely cease until expiration of two months. Although after a fortnight nearly all signs of intoxication had gone, the intensive treatment was continued for a further period of one month and then gradually reduced to two injections of serum weekly. In August the patient came to Geneva. She had gained 1 st. 10 lb. in four months. X rays showed total opacity of the whole of the left lung and the right base. September, 1920: Examination showed no pulmonary activity. April, 1921: Re-examined, no active physical signs, patient cured.

Short Duration of Passive Immunity.

CASE 5.—Mr. J. (Charts 3, 4, and 5, Fig. 2) had pulmonary tuberculosis with softening of the left apex and infiltration

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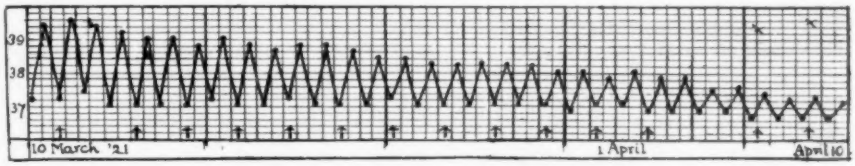

CASE 5.—Second relapse and third treatment.

of two-thirds of left lung and right apex. Bad cough, abundant expectoration, lassitude, profuse night sweats. Large number of tubercle bacilli to be seen in every field. Mouth temp. 100·4°–101·5° F. Emaciation, sleeplessness, no appetite. September, 1915: Administration of Spahlinger's *serum*. Marked improvement within two months, temp. normal, sputum greatly diminished, gained 1 st. 3 lb. Treated with *complete serum* until October, 1916, by which time he was in such excellent health that he joined up for military service in France with no active physical signs, no cough, no sputum, and a gain in weight of 2 st. 2 lb. 1917: Rejected from the army with a relapse of pulmonary trouble, returned to Geneva. August, 1917: Temp. 103·3°–103·6°. Abundant expectoration, violent attacks of coughing, night sweats. Pulse-rate 115–120. Had lost 2 st. 1 lb. and was in an exceedingly collapsed condition. Hæmoptysis, active signs all over chest, acute softening of right apex with infiltration of the rest of the lung, and exacerbation of all the old foci on left side. Spahlinger's *serum* administered. Marked improvement within two months. Temp. 99·3° by mouth. Gained 13 lb. In January he resumed his work as a tailor, which he had given up four years previously. Cough and sputum practically gone, physical signs dry. May, 1919: Attack of influenza which caused an immediate recrudescence of the pulmonary

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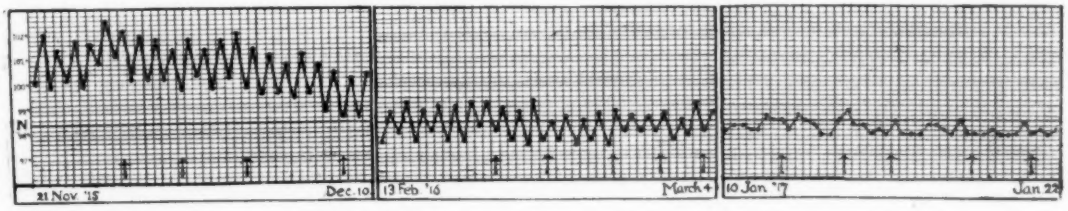

CASE 7.—Pulmonary tuberculosis. Three portions of patient's charts showing steady defervescence during serum treatment.

trouble, rapidly checked by the administration of *serum* by mouth and by injections. In May, 1920: Serum treatment was stopped, with resulting relapse. Sputum, cough, and tachycardia reappeared, also rise of temperature. *Serum* treatment recommenced and continued until the end of September. Great improvement, no active physical signs, practically no cough nor sputum. Beginning in December another relapse. *Serum* treatment given from December until January. Patient again improved, put on weight, fever and tachycardia disappeared. Serum withheld from January until March. Fresh relapse, lost 4 lb. 5 oz. Temp. 103·3°, pulse-rate 95–100. Lassitude, signs of intoxication, active physical signs. On March 10th: *Serum* treatment recommenced with immediate improvement. April 10th: Temp. normal at end of hard day's work, great diminution of cough and expectoration. Physical signs and general condition greatly improved, no tachycardia. This patient is now undergoing vaccine treatment.

X-Ray Finding in Three of the Cases Treated with Spahlinger Serum.

CASE 4.

CASE 5.

CASE 7.

CASE 6.—Dr. C. S. In July, 1918, a swelling appeared at the head of the left epididymis about the size of a bean. Tubercular epididymitis diagnosed by Dr. Calot and Prof. Sebileau, but surgical intervention strongly discouraged. Condition unchanged until March, 1919, when lesions steadily increased in size until August. By this time the head of the epididymis was completely involved, and consisted of a tumour about 3 cm. in length and of the thickness of the little finger, englobing the testicle. Nodules also in the testicle itself. In September a nodule appeared in the right testicle, and in October a hydrocele developed of about 200 c.cm. capacity. Treatment began at the beginning of November, 1919, with the daily absorption, for a period of only three days, of 10 c.cm. of Spahlinger's *serum No. 5*, taken by mouth. Complete disappearance of the liquid from the hydrocele. After a rest of ten days the patient received a course of six 2 c.cm. injections. An interval of ten days was then given and the course repeated. The serum used was in both cases a mixture of *partial sera* (*No. M 1* for surgical tuberculosis). After three weeks' rest, temperature, lassitude, and anorexia manifested themselves. These remained a fortnight, but during this time the tumour gradually disappeared until at the end of this period both testicles were of normal size, smooth and without evidence of tuberculosis. This case was under the supervision of Profs. Gosset and Desmarais, both surgeons in the Paris hospitals. September, 1920: Patient relapsed, treated with *partial sera No. M 3*, but without improvement. Ten injections of *partial sera M 1* then used. This resulted in complete recovery.

Occasional Long Duration of Passive Immunity.

CASE 7.—Mr. H. N. (Chart 6 and Fig. 3), an advanced case of pulmonary tuberculosis. Cough since bronchitis in 1913. July, 1914: Hæmoptysis. November, 1914: Went to Switzerland, T.B. found in sputum. Treated at an anti-tuberculosis dispensary with Béraneck's tuberculin, no improvement, big hæmorrhages in March and April, 1915. May: Troublesome cough, abundant yellow expectoration, blood-stained. Lassitude, emaciation, profuse night sweats, intense dyspnœa. Temp. 101·1° F., pulse 110. Palpitations, indigestion, continual diarrhœa, vomiting, sleeplessness. May 21st: Spahlinger's *serum* administered. Cessation of sweats, put on 4 lb. 4 oz. in one month. In July injections stopped as no more antitoxic serum was available. August: Fresh exacerbation of disease, several bad hæmorrhages (two pints in one day) continuing for some weeks, rapidly getting worse. November: Condition critical. Temp. 101·2°–102·4°. Lost 1 st. 10 lb. Return of all former symptoms in exaggerated degree, unable to eat, extreme emaciation. Frequent injections of Spahlinger's *serum*. Slight improvement, but by the end of December still in critical condition, unable to sit up and be examined. February, 1915: Started to get up, general condition gradually improving. Temp. normal, pulse 84–90. Physical signs much better. November, 1916: No cough or other trouble, resumed normal life. 1917: No active physical signs, pulse normal. Rectal temp. 98·6° despite daily work. No cough or expectoration, though still very dyspnœic. Cured, but treatment continued until the end of 1917. April, 1921: Patient well for past three years. Works eight to nine hours a day. No active physical signs. No cough or expectoration. Rectal temperature below 98·6°. Still some dyspnœa but less than in 1917. Appetite excellent. Weight well up to normal. No relapse, though patient never underwent vaccine treatment.

CASE 8.—E. S., aged 13. Glands of neck appeared in 1914. 1916: Bad attack of bronchitis which never cleared up. From this time on patient began to cough and expectorate. 1918: Pulmonary tuberculosis diagnosed, T.B. present. Rapidly becoming worse. August, 1919: Infiltration of whole of left lung and right upper lobe with cavities on both sides. Bad cough; yellow expectoration, latterly coloured. Temp. 101·2°–103° F., pulse-rate 120. Palpitations, irregular night sweats, severe dyspnœa, anæmia, much wasting, no appetite, tongue coated, clubbing of fingers. August 3rd: Spahlinger's *serum* commenced. Within ten days patient put on 1 lb. 12 oz., appetite better. Oct. 1st: Great improvement. 4th: Contracted influenza, this he got over satisfactorily. 28th: Temp. normal, pulse 96. Fibrosis of both apices without catarrhal signs. Large cavity in right upper lobe much drier, râles greatly diminished at left base. Gained 9 lb. 9 oz., cough and expectoration greatly diminished. Dec. 2nd: Patient went out in the cold insufficiently clad, serious relapse. Temp. 102·2°. Much cough and expectoration, severe dyspnœa, acute congestion of both lungs. *Serum* administered in large doses daily. Dec. 17th: Patient out of danger and showed signs of improvement. Kept in bed until March, 1920. Intensive *serum* treatment being continued until the end of April. April 25th: Physical signs quite dry, no cough or expectoration, no tachycardia. Temp. normal. Able without any symptoms of relapse to resume a normal existence. November, 1921: No active physical signs. Still evidence of cavity in right lung. No treatment since April, 1920, and no relapse, though patient had never received a course of vaccines.

CHORION-EPITHELIOMA.

BY J. M. MUNRO KERR, M.D., F.R.F.P.S. GLASG.,
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(*With Coloured Plate.*)

THIS variety of malignant tumour presents many interesting and peculiar features. The note on the condition which follows is a section of a book, now in the press, entitled "Clinical and Operative Gynæcology," and the coloured plate appears with the permission of the publishers. Its origin is perfectly definite; it arises from the epithelial layers of the chorionic villi. Prof. J. H. Teacher, who has given greater consideration to this particular tumour than any other pathologist in the country, held that the connexion with pregnancy was essential.[1] There have been described, however, in recent years a number of tumours where the growths presented the microscopic appearances of chorion-epithelioma, and where there was no history of pregnancy; and, indeed, not a few cases where such tumours have been observed in men. The first case of this nature was described by Kanthack and Eden.[2] The growth occurred in a testis, and there were numerous metastases. Such tumours probably arise exclusively in teratomata, and the chorion-epithelioma tissue represents the trophoblast of the included ovum. In a very large percentage of cases—50 per cent. it is stated, although that is a higher figure than in my own personal experience—this tumour has been preceded by the expulsion of a hydatidiform mole. The metastases often disappear after the primary tumour is removed, and there are even cases in which spontaneous cure of the primary growth has occurred. Lymphatic gland infection is almost negligible.

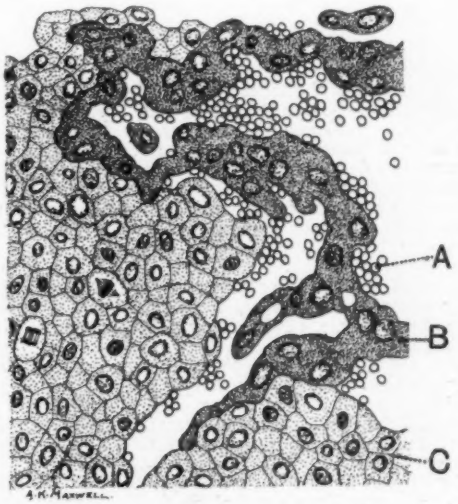
Pathological Anatomy.

Macroscopic Appearances.—In the early stage the tumour may affect a wide area of uterine mucosa or be simply a small nodule embedded in the muscle wall. Sooner or later it spreads in all directions, sometimes completely penetrating the wall, at other times projecting as a large, bulky, irregular mass towards the uterine cavity. This may produce considerable enlargement of the uterus; in fact, in most of the cases I have operated upon the uterus has been about the size of a three-months' pregnancy. The uterus is generally soft and globular and freely movable, unless inflammation of the peritoneum or extensive metastases in the cellular tissues have anchored it. The coloured plate is an example of an advanced chorion-epithelioma.

The cut surface of the tumour is characteristic, numerous hæmorrhages are present, and, as Teacher states, "the tumour presents a considerable resemblance to a fleshy mole." The surface appears in the later stages ulcerated, irregular, and sloughing. Metastases are very frequent, and the most common sites for them are the vaginal walls, the parametrium, the lungs, and the brain, but, of course, they may occur in any organ. Occasionally the symptoms associated with them are more pronounced than those caused by the primary growth; in a few cases of this kind the primary tumour has healed. Thus it comes about that failure to recognise and appreciate the primary lesion has led to many difficulties in elucidating obscure cases showing pulmonary, cerebral, hepatic, and renal symptoms the result of metastases. In all cases associated with obscure symptoms following a recent pregnancy, and especially an abortion, chorion-epithelioma should be borne in mind.

There are a number of cases now on record where the primary tumour followed a mole in the Fallopian tube (extra-uterine pregnancy). One of the most interesting cases of this kind is the one recorded by Cope and Kettle.[3]

Microscopic Appearances.—These are equally characteristic, and are shown in the illustration given below. Three groups of cells are observed: (1) Masses of nucleated protoplasm, often vacuolated (syncytium); (2) masses of nucleated cells polyhedral in shape and closely packed together (Langhans's cells); (3) large, often multinucleated cells of varied shapes. Throughout the whole mass are numerous hæmorrhages, and on the surface necrotic areas; but the tumour does not contain connective tissue of its own; any seen in the mass is the remains of the eroded portion of the uterine wall. Anyone who has seen a section of a typical chorion-epithelioma can never forget it; it is so characteristic. The only difficulty is where there are large numbers of chorionic villi and a relatively small quantity of trophoblast, for in such cases the tissues may simply be placental debris of an ordinary abortion or a relatively innocent hydatidiform mole.



Microscopic appearances presented by chorion-epithelioma. A = red blood cells. B = syncytium. C = Langhans's cells.

Clinical Features.

As a text for my remarks I give the records of two cases operated upon by myself and reported upon by Prof. Teacher. The first case illustrates how a small malignant area may be missed by the curette.

CASE 1. *Early Chorion-epithelioma: Hysterectomy by Clamp Method.*—This patient was aged 28, and had one child six years old. She was sent into the Royal Infirmary by Dr. Gilchrist, with the diagnosis of chorion-epithelioma. The history was that two and a half months ago she had an abortion, and a hydatidiform mole was expelled. She was curetted in the Maternity Hospital. Some time after returning home she began to have hæmorrhage, which increased in severity and frequency. The uterus was curetted and the scrapings sent down to the pathological institute. The pathological report was that there was no evidence of chorion-epithelioma. She returned home, but about a week later she began to bleed again. Her doctor again sent her into hospital. On clinical grounds I was satisfied that there must be a chorion-epithelioma, and so I removed the uterus by the vagina, employing the clamp method. The examination of the uterus after removal showed a very early chorion-epithelioma about the middle of the body of the uterus. The specimen is now in the pathological institute of the Royal Infirmary.

CASE 2. *Advanced Chorion-epithelioma: Hysterectomy by Clamp Method.*—The patient, aged 36, was admitted to a nursing home in an extremely collapsed condition. She had had great loss of blood. Her doctor informed me that she had no full-time children, but that she had had two

[1] J. H. Teacher: Chorion-epithelioma Malignum. Eden and Lockyer's New System of Gynæcology, 1917, vol. ii., p. 555.
[2] Trans. London Obstet. Soc., 1897, p. 149.
[3] Proc. Roy. Soc. Med. (Obstetrical Section), vol. vi., p. 247.

miscarriages—the last one at the third month. Three weeks after this occurrence she began to bleed profusely, which was looked upon for a few days as due to incomplete abortion, and the uterus was curetted. Little improvement followed, for in a very short time there was a recurrence of the bleeding. From her history I was sure that she was suffering from chorion-epithelioma, so I decided to operate. At this time she was extremely collapsed and in a very critical condition, so I elected the vaginal route and employed the clamp method. The operation lasted less than five minutes. The patient was put back to bed and transfused, and ultimately made a very satisfactory recovery. The tumour was a very far advanced chorion-epithelioma which had undergone extensive necrosis. The specimen is now in the Royal Infirmary. She made an uninterrupted recovery and is now in perfect health, although the operation was performed ten years ago.

From these two typical cases it is evident that the clinical features of this tumour are just as definite as its pathological characters. There has always been a pregnancy. Generally there has been an abortion, and in about 50 per cent. of cases the body expelled has been a vesicular mole. In a very few cases the tumour has developed after an apparently normal full-time pregnancy. Probably in such cases, if the placenta had been examined more particularly, some of the villi might have shown hydatidiform degeneration, for this is occasionally observed with a full-time healthy child. Occasionally the tumour has developed while the ovum was still in the uterus. Very occasionally, as we have seen, the uterus has been found free of tumours, the primary growth having healed.

The outstanding symptom is hæmorrhage, often very profuse. Most commonly this is attributed to a retained portion of ovum or placenta. If not immediately dealt with the hæmorrhage ceases for a time, but soon recurs. Still later, as the disease advances and ulceration occurs, pronounced anæmia and cachexia develop, with febrile pulse and temperature. At any time anomalous symptoms associated with lesions in brain, lungs, or elsewhere may arise, indicating that metastases have occurred in these organs.

The physical examination may reveal nothing very definite unless metastases can be detected in vagina or labium. The uterus is enlarged, globular, and relatively soft. The cervix is softer than normal and the canal fairly patent. Any instrument, such as a sound or dilator, passed into the uterus is immediately followed in most cases by most profuse bleeding, as, for example, in Case 2 already recorded.

Differential Diagnosis.

This is one of the gynæcological affections in which the anamnesis is of very special assistance to a correct diagnosis. The condition which most closely resembles chorion-epithelioma is retained portions of placenta and membranes. In both curettage is undertaken, when a considerable amount of debris is removed. When chorion-epithelioma was unknown the debris removed was thrown away. Now, however, such tissue is submitted to a pathologist, and on his finding the diagnosis is made. Only in very early cases is there any chance that the curette will miss the malignant growth.

Another condition which may resemble chorion-epithelioma is a submucous fibroid, especially if it is undergoing necrosis, but the microscopic examination will clear matters up. If the cervix is sufficiently dilated and a finger can be passed into the uterine cavity the submucous fibroid can be readily felt as a defined tumour, while the chorion-epithelioma feels more like the rough raised placental site. Besides, the bleeding from the fibroid is moderate; from a chorion-epithelioma it is extreme.

Treatment.

Let me quote Teacher's words in this connexion: "The initial difficulty upon which too much emphasis can scarcely be laid is that of diagnosis, and it is clear that mistakes are unavoidable; but in view of the moderate mortality of hysterectomy in favourable cases and the extreme danger of the tumour if untreated, it is better that a few uteri be removed and found not to contain tumours than that operation should be delayed in the hope of obtaining absolute certainty of diagnosis until it is too late." Could any advice be wiser?

The treatment is complete removal of the uterus and of any metastatic growths in vagina, labium, or other accessible parts. We have seen that the malignancy of this tumour is very variable, and that secondary growths may disappear if the primary tumour is removed. Still, in spite of that fact a large proportion of cases die as the immediate result of operation and a considerable number from metastases.

In my eight cases two died as a result of the operation; two died of metastases; two are still alive who were operated on many years ago; one who was operated on a year ago is still well; and one I have no record of. A permanent cure, taking early and late cases, may be expected in about 30 per cent. of cases, showing a result a little worse than in carcinoma of the uterine body. I have thrice performed vaginal hysterectomy and five times the abdominal operation. In one of the worst cases the patient was so collapsed and anæmic that I performed the vaginal operation and employed clamps to control the blood-vessels in the broad ligament. (Case 2.)

It is unnecessary to do a Wertheim operation in this condition as the glands are rarely, if ever, affected. Besides, it takes a much longer time, and in all cases the shorter the duration of the operation and the less blood lost the better the chances of success.

A CASE OF
VENOUS ANGIOMA OF THE CEREBRAL CORTEX.

BY HARRY CAMPBELL, M.D. LOND., F.R.C.P.,
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AND

SIR CHARLES BALLANCE, K.C.M.G., F.R.C.S.ENG.,
VICE-PRESIDENT, ROYAL COLLEGE OF SURGEONS OF ENGLAND.

(*With Illustrative Plate.*)

THE case here described is that of F. P., a male aged 23, who was admitted into St. Katherine's Hospital, Regent's Park, on Nov. 1st, 1920.

History.—Ten years ago he began to notice weakness in the left arm and leg which had progressively increased up to the time of admission. Since the beginning of the weakness he had suffered from fits involving the same side, generally beginning with numbness in the left toes; the numbness spread upwards; when it reached the left hand the latter closed; when it reached the left temple the head turned to the left and the mouth opened. After a fit severe headache was felt.

Until three months before admission the fits occurred about once every six months. During those three months they had been more frequent, occasionally accompanied by clonic spasms on the left side, with biting of the tongue and loss of consciousness.

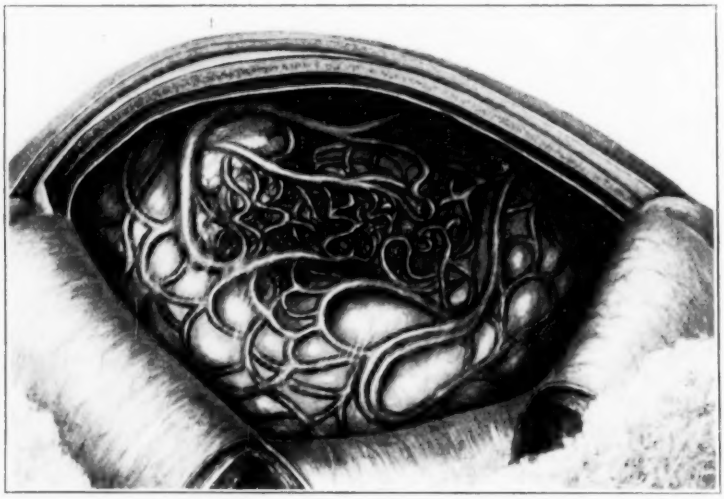
Present Condition.—On examination the patient was found to have a mild degree of left hemiplegia, with great increase of the deep reflexes in the left upper and lower limbs, and loss of the abdominal reflexes on the left side. Left ankle clonus. The toe phenomenon not obtainable. The ordinary sensory tests gave fairly normal results on the left side, but patient's answers were doubtful; the optic discs normal; Wassermann reaction negative: there was diminished sensory discrimination suggesting implication of the post-central gyrus.

AN ADVANCED CHORION EPITHELIOMA.

The Uterus cut open to show the Tumour in cross-section.

The inset shows a metastatic growth removed from the vaginal wall.

TO ILLUSTRATE DR. HARRY CAMPBELL'S AND SIR CHARLES BALLANCE'S CASE OF VENOUS ANGIOMA OF THE CEREBRAL CORTEX.



From a drawing of the appearance of a Venous Angioma displayed at operation. The most prominent part of the Angioma was within the concavity formed by the bend of the large vein near the middle line, corresponding to the upper part of the ascending parietal convolution.

TO ILLUSTRATE MR. A. E. MORTIMER WOOLF'S CASE OF BILATERAL INTERSTITIAL RUPTURED ECTOPIC GESTATION SACS.

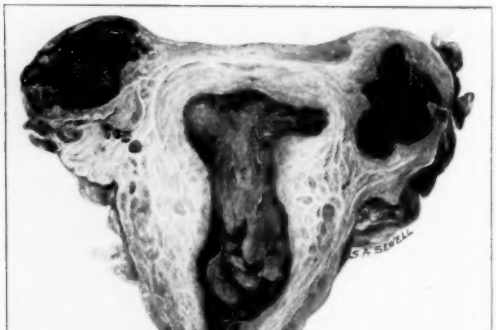


Fig. 1. Coronal Section of Uterus.

Fig. 2. Anterior Aspect of Uterus.

Diagnosis.—A progressive lesion—neoplasm—involving the post-central and pre-central gyri. The patient was retained in hospital for observation. On Nov. 16th, 1920, he had a slight attack while in bed, 7 A.M. Numbness started in the left big toe, worked up the left leg thigh to side of head and down the left arm to the fingers. There was no spasm or loss of consciousness. On Jan. 31st, 1921, slight attack of numbness in the left leg in the morning, and on the same evening a similar attack beginning in the hand; he lost consciousness, and the left arm was convulsed.

Operation.—April 2nd, 1921: The plan of operation was to expose the upper part of the ascending parietal and frontal convolutions, remembering that the fits commenced with a sensory aura in the left big toe. A scalp flap was turned down, the upper incision running along the sagittal line. A considerable area of bone was exposed. The anterior, posterior, and lower sides of a quadrilateral of bone about four inches square were divided and at the upper border disarticulation of the sagittal suture was effected. The dura mater thus exposed did not show anything abnormal but was a little more tense than normal. On making a flap of the membrane with the base downwards a venous angioma beneath the arachnoid membrane was exposed (see illustration). At one point the dura was adherent to the arachnoid, and on separating the adhesion a vein bled, but the bleeding was easily controlled. The most prominent part of the angioma was within the concavity formed by a bend of a large vein near the middle line and was whitish in colour due to some change in the arachnoid. This is visible in the drawing and corresponds to the upper part of the ascending parietal convolution. The nævus extended far beyond the limits of the exposed cortex, and as the patient showed some signs of collapse further examination was postponed and the wound closed.

Second Operation.—April 9th: More bone was removed behind, below, and in front of the previous opening in the hope of getting beyond the region of the angioma. The brain was then depressed by a spatula in all directions, and a bright light was used for these examinations. The whole external surface of the hemisphere was covered with enlarged veins and on examining the inner surface of the hemisphere the same condition was found there also. The large cranial opening made it easy to examine both the inner and outer surfaces of the cerebral hemisphere. An incision was made through the arachnoid posterior to the largest vein seen in the drawing in order to see whether the angioma could be lifted off the cerebral cortex. This was found to be impossible, for numerous veins became visible, perforating the cortex in all directions, some large, but most of them small. The tumour, therefore, was growing from the vessels of the pia and cortex. Unfortunately, two of these smaller veins gave way during this part of the operation and required to be ligatured, which was probably the cause of the wrist-drop on the left side after the operation.

After the operation the patient rallied well and left the hospital in August, 1921, wearing a skull cap with metal plate covering the opening in the cranium. He limped slightly; the wrist-drop had much improved under massage.

One of us (H. C.) saw him again on Oct. 24th, 1921. He had had two slight fits both on the same day since leaving hospital. There was naturally no improvement in the hemiplegia, as advanced pyramidal degeneration existed before the operation.

Remarks.—The salient facts of the case before operation were: (1) the long history; (2) the very slow ingravescence of the hemiplegic paresis; (3) the absence of optic neuritis; (4) fits commencing with a sensory aura of the left big-toe area; (5) failure to localise light touches on the skin of the left foot and leg and the left hand and forearm. These facts pointed to the presence of a widespread chronic cortical lesion.

A CASE OF
BILATERAL INTERSTITIAL RUPTURED ECTOPIC GESTATION SACS.*

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(*With Illustrative Plate.*)

THE occurrence of bilateral ruptured ectopic gestation, although rare, is perhaps not so infrequent as I had expected. Noble[1] has reported a case; Mr. Clifford White informs me that he has had a case in his own practice and knows of another. Interstitial tubal pregnancy is uncommon; ruptured bilateral interstitial ectopic gestation must be so infrequent that it is desirable to publish this instance. I am unable to find records of any similar instance, and believe the specimen to be unique.

The patient was admitted to hospital on April 19th, 1920. She had been married for seven years, and had one child six years old; no miscarriages, no pregnancies since birth of child; no previous illnesses. Amenorrhœa had existed since Feb. 13th, 1920. On Wednesday, April 14th, 1920 (i.e., five days previous to admission), at 8.30 A.M., while dressing, she was seized with sudden sharp pain in the left side of the abdomen which caused her to double up. This pain lasted all day, but passed off at about 7 P.M. On the Thursday, Friday, and Saturday she felt quite well except for some slight weakness. On Sunday morning, the 18th, about 10.30 A.M., she was again seized with acute abdominal pain which was general throughout the abdomen. She fainted. The pain was continuous until she was admitted to hospital on the following afternoon (Monday, the 19th). Vomiting was frequent during the Sunday and Monday.

On examination the lower half of the abdomen was distended. The abdomen was fairly rigid all over. Tenderness was present throughout, but was more marked over the epigastrium; dullness was present in both flanks; patient looked very pale. The pulse was thready in character, 144; temperature 99° F. Examination per vaginam revealed nothing abnormal. She was constantly retching. I diagnosed a ruptured ectopic, and operated immediately.

Operation.—Monday evening, 8.30 P.M.: Median incision below umbilicus; when the peritoneal cavity was opened a large quantity of dark-coloured blood escaped. The right tube was seized and clamped. In the intramural portion of both tubes there were gestation sacs which had ruptured. A large hæmatocele was present on the left side. The pelvis contained numerous blood-clots. The patient was in a precarious condition, and the most rapid operative procedure was obviously essential. I considered that excision of both tubes by wedge-shaped incisions and subsequent suture of uterine walls would have involved too big a risk owing to (1) further hæmorrhage and (2) the time which such a procedure would have occupied. I therefore performed a sub-total hysterectomy. The patient stood the operation well and made an uneventful recovery.

The catalogue description of the specimen (No. 464A, Royal College of Surgeons Museum, Gynæcological Series) is as follows (see illustrations): "A coronal section of a uterus which was excised. In the wall there is on either side at the upper angle a mass of blood about the size of a cherry, which represents an interstitial pregnancy. In the clot on the left hand side may be recognised one or two uncoloured foci which microscopic examination shows to consist of chorionic villi. The sac on the right hand side has ruptured and from it there projects an irregular eminence of coagulum. The uterine mucosa has

* Specimen shown at a recent meeting of the Section of Obstetrics and Gynæcology of the Royal Society of Medicine.

[1] Noble: Double Ectopic Pregnancy. Both Sides Ruptured. Operation. Recovery. Amer. Jour. Obst., 1901, xliii., p. 497.

undergone a simultaneous thickening and is hyperæmic; the muscular wall is hypertrophied."

No microscopic section of the sacs has been made. For this reason it is perhaps not certain that both are interstitial. It is possible that they may be isthmial, although this seems unlikely in regard to the left side. The differentiation in this case is of academic interest only. From a practical point of view the case had to be treated as a bilateral interstitial pregnancy.

Cases of ruptured ectopic gestation provide, perhaps, the most dramatic operations in surgery. Generally the patients do well, despite the loss of considerable blood. I have been especially impressed with the very rapid convalescence of these cases when once the ruptured sac has been ablated. There is some big physiological difference between hæmorrhage from a ruptured ectopic and hæmorrhage from a vessel. If, for instance, a mesenteric vein had poured out blood to the extent that occurred in the above narrated case a fatal termination would quickly have ensued. Yet this patient had presumably been bleeding for five days from either one or both sacs. During convalescence recovery is much quicker than after hæmorrhage from a vessel. There are none of the severe results which occur, for instance, after a post-operative hæmorrhage. I believe this difference is, within limits, irrespective of the speed with which the blood escapes, and that it is a real physiological difference. Possibly it may be due to re-absorption of hæmoglobin. After the operation a certain amount of blood always remains in the pelvis, and from this hæmoglobin must be absorbed. It may be that the amount of blood is deceptive, as it is mixed largely with fluid—peritoneal exudate—and consequently not so much blood is lost as appears at first sight. The amount of blood-clot is, however, considerable. The explanation be what it may, I believe that hæmorrhage from an ectopic gestation is not nearly so grave in its results in the majority of cases as is hæmorrhage from a vessel.

I am indebted to Mr. S. A. Sewell for the drawing of the specimen.

THE FIXATION ABSCESS.

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THE following account of a method of treatment little known in England, but much practised in France, may be of interest, if not of some value, in certain types of severe illness. My attention was directed to this method by an article of Netter[1] in which the following sentence occurs: "Nous lui avons dû la guérison de nombreux sujets atteints de grippes avec broncho-pneumonies des plus graves que n'ont pu sauver aucune des autres médications." When this article appeared there were several severe cases of influenzal broncho-pneumonia in the various hospitals, and other methods of treatment having failed to give good results, I determined to give a trial to this method. The results will appear in the description of the cases.

I regret that I can do little more than describe the cases. I had intended to work at the subject much more fully in man, and also to determine the effect of the treatment in animals inoculated with a lethal dose of pathogenic micro-organisms. But for various reasons I have been unable to carry out this plan, and there is at present no immediate prospect of sufficient time being available for this study. Moreover, the type of case giving the indication for this treatment is no longer occurring in this area, so that my chance of increasing the series is now slight. I will therefore give a description of the treatment and of the cases to which it was given, and summarise the observations made on the condition of the blood.

French Origin and Use of the Method.

As the available literature here is scanty I have been unable to look up the history of the treatment. In its present application the method was originated by Fochier, of Lyons, in 1875; he noted that an abscess which resulted from a subcutaneous injection of quinine appeared to influence favourably the course of a puerperal infection. In 1891 he published his first communication on the subject, describing the method in use at the present time. Fochier assumed that the injection of the irritant led to a condition of lowered resistance at the site of injection, and presumed a congregation of infective micro-organisms in the pus which resulted in a successful "take"; evacuation of the pus, and therewith of the offending virus, was the end at which he aimed. Needless to say, there is no proof to support this theory and much evidence against it—e.g., the constant sterility of the pus. The indications to be drawn from such a theory led to an enthusiastic application of the method in many and very varied conditions, with the result that the treatment was generally discredited, and was little employed except around Lyons[2]—a prophet in this instance having honour in his own country. It was apparently restored to favour during the past epidemics of influenzal broncho-pneumonia, when most observers, including some of the leading French physicians, found it of value. In the epidemics of encephalitis lethargica which succeeded another trial of the method was made, chiefly *faute de mieux*, and here it met with such success[3] that it has now a firm footing in modern French therapeutic procedures.[4] In this country, however, I can find no evidence of a fair trial of the method. At an early stage of the epidemic of influenzal pneumonia some observers certainly noted an amelioration of the symptoms in one case in which an abscess resulted fortuitously from an injection of normal saline, and they attempted to encourage suppuration in other cases by a repetition of the saline injections, and also by the injection of a streptococcal antigen; they met with no further successes.[5] More recently, when tried in a case of encephalitis lethargica, Fochier's treatment did not prevent a fatal termination.

Method of Provocation.—The skin should be well cleaned with alcohol at the site of the injection; then 1 c.cm. of turpentine is injected subcutaneously, care being taken that the fluid is injected above the fascia. With regard to the site of election, Lyon[6] advises the flank, between the iliac crest and the lower ribs; I have tried this site and think that the pain is more marked than when the injection is made in the upper part of the front of the thigh. The pain which always attends a successful injection is largely influenced by the movement of the parts, and in pneumonia, at least, there is more hope of keeping the thigh at rest than the abdominal muscles. When the abscess is forming, prior to incision, some of the pain is due to tension, and it will be less marked where the superficial fat is well developed and loose; for the same reason the injection should be superficial to any strong fascial structures. In spare subjects with tense skins the flank is found more suitable than the thigh. If success attends the injection there will be redness, heat, and swelling round the puncture, all well marked within 24 hours. These increase until a large, brawny swelling results in which fluctuation is usually demonstrable about the fourth day. A small incision should then be made in the fluctuant area, the pus expressed, the part washed with alcohol, and fomentations applied until the incision is dry. Fluctuation is usually obtained from the fourth to sixth day, and incision should not be delayed after the latter date, provided adequate signs of inflammation are present. For the pain which attends pyogenesis hot moist applications are recommended. If within 48 hours of the injection there are no signs of marked inflammatory reaction it is probable that either too little turpentine has been given or that the patient is too feeble to react to the stimulus. In such a case another injection of a somewhat larger amount should be made, for all observers are agreed that the failure of the abscess to "take" is of very grave prognostic omen. It was at one time believed that the good effects of the treatment

terminated with the incision; there is ample proof that this belief is incorrect.

Mode of Action.—So far as knowledge extends at present the treatment owes its success either to stimulation of leucocyte formation and activity or to some coincident change in the plasma. A marked leucocytosis results, chiefly affecting the neutrophil series. Mozer [7] noted the appearance of myelocytes in the blood, and a similar occurrence will be noted in the cases below: in addition normoblasts were noted. An Arneth count shows a rapid development of young polymorphs—a marked left shift. It is generally recognised that the increase of leucocytosis, in those infective conditions which provoke this change, is a measure, if not the cause, of the increment of the resistance, and a failure of leucopoiesis is regarded as of bad omen. Thus any procedure which will stimulate leucocytosis is considered of value in the treatment of "septic" conditions. I know of no other procedure which is so certain of response; cinnamic acid and nuclein are not so reliable. The mere increase of leucocytosis is probably not the only factor, for in encephalitis lethargica, in which this form of treatment has met with much success, the reaction of the tissues to the virus takes the form of a local increase of mononuclear cells, which are apparently only slightly increased by the fixation abscess. Future work should throw more light on the mode of action of this procedure.

Indications.—Indications for the employment of the method of Fochier. The rational indication—i.e., that drawn from a knowledge of the mode of action—would limit the procedure to those conditions in which "phagocytosis" is believed to play a part in the natural process of recovery, and when there is reason to believe that this is not progressing satisfactorily. Such evidence is of two kinds: firstly regression in the clinical condition of the patient, and secondly, a feeble or absent leucocytosis. At the present time the method is being employed in broncho-pneumonia of the influenzal type, pneumonia generally, and those conditions of basal pulmonary congestion of the French observers which we regard as pneumonia. It has been used in other septicæmic conditions, including the puerperal sepses,[8] but definite facts and figures are difficult to acquire in the latter. In two cases of general sepsis in this series, one with evidence of peritonitis and the other a proved case of subacute bacterial endocarditis, the method appeared to be of some assistance. In addition the method has had much success in the treatment of encephalitis lethargica.

So far only the indications for the therapeutic uses have been dealt with, there remains to be mentioned the bearing upon prognosis. When the abscess develops promptly after the injection the prognosis is good, and conversely, a failure to take, especially after a second attempt, is of very grave significance; the latter is more absolute than the former. Thus, of 21 cases of influenzal pneumonia in which no abscess developed, 19 died[9]; in 83 cases of encephalitis abscess resulted 67 times, of these 5 died; but of the 16 cases who did not take only one recovered.[10]

The benefits of the treatment have now been mentioned, and it remains to remark the drawbacks. Of these the most prominent is the pain of the abscess formation; this is severe as a rule, but varies considerably, for it depends largely on the personal factor. A few of the patients make little complaint. The pain may be combated in several ways—firstly, I am convinced that there is less pain when the thigh is made the site of the abscess; secondly, while the abscess is ripening, the frequent application of hot moist dressings not only eases the pain, but also appears to hasten the pyogenesis; thirdly, the pain becomes more prominent when it is suggested to the patient that the pain will be severe. It has been proposed that such a treatment, after the initial improvement attendant on any form of stimulation has passed off, will leave the patient weaker and more easily overcome by the infection. This is mere supposition and I have been unable to find any facts to bear it out. Amongst still more trivial objections, it has been pointed out that if the treatment is successful, the patient will be obliged to undergo a minor surgical operation and afterwards require many dressings. Arguments of this kind need no further attention. The pain is certainly to be considered, but the clinicians who have had most experience of the method are in agreement that the benefits far outweigh the drawbacks; take the figures of Netter in encephalitis, and these figures are chosen because the cases were not left too long—as a rule, the case mortality works out at 24 per cent., instead of the usual 40-50 per cent.[11]

Time of Administration.—It is generally recommended that the treatment should be instituted at a fairly early stage; it is of no use to a moribund patient. Many failures may be justly attributed to delay, and one of the most able expositions on the subject emphasises this point.[12] It may be said that the treatment is indicated in any grave infective condition as soon as there is evidence of too feeble leucocyte response; in encephalitis lethargica the treatment should follow as soon as the diagnosis has been made. Owing to the lack of definite knowledge as to the mode of action and of the indications for this treatment, when I first made a trial I selected those cases which, in my opinion, were unlikely to recover on the usual treatment; I can affirm that I did not expect cases 3, 6, 8, and 9 to recover. It may be objected that this is merely a matter of supposition, and that cannot be denied. I can only say that I have dealt with a large number of cases of influenzal pneumonia during the past epidemics and attained a fair certainty in their prognosis. Some indications of the gravity of the cases will be included in the notes, which have been much condensed.

CASE 1.—Pte. C., double pneumonia; has been in hospital 11 days and is going down hill. Seen May 27th, 1920; heart rapid and sounds poor, first sound very soft and short. Pleuro-pericardial rub over left border. Is cyanosed, has dry, coated tongue, but is bringing up sputum fairly well. Advise fixation abscess, which was given on the 30th, when his condition was poorer. Next day his temperature was lower. Incision on the fifth day. He steadily improved and the later history is uneventful except for a small right-sided pleural effusion.

In this case I do not say that there was, in my opinion, no hope for the patient on the routine treatment, but state that he was very ill. The scantiness of the notes in this and some of the other cases is dependent on the distance of the patient from my base.

CASE 2.—Pte. S., broncho-pneumonia. Patient has been regarded and treated as malaria, chiefly on account of the history. Seen June 11th, 1920, after five days of hospital treatment on quinine. Temperature 101° F., colour cyanosed, pulse poor quality and varying about 100. Heart, first sound relatively feeble. Chest, several large consolidated patches in both lungs, with much bronchitis. Sputum is thin, mucoid, and deeply blood-stained. A fixation abscess was advised, but was not given until the next day, when cyanosis was more marked and the patient was delirious, needing restraint. Injection on the 12th. On the 14th patient was a little better. On 16th abscess opened; patient quiet and taking food well; there was very little pus in the abscess. On 18th, numerous deeply congested abscesses appearing on chest and arms, pus containing many staphs.; these are the result of the previous quinine injections. The fixation abscess had dried up (this usually takes a week or more). On 21st was rather better, temp. lower. On 22nd temp. was normal. Next day, however, patient became worse, temp. rose again, and a large patch of consolidation developed at the left base; in addition diarrhœa set in. I advised a repetition of the fixation abscess, since the first one was so small; a larger injection of turpentine was given, but there was no result. The patient died two days later.

CASE 3.—Pte. D., broncho-pneumonia; a previous attack in 1916. Seen June 15th, 1920; temp. 102–104° F.; pulse 100–108; blood pressure, syst. 102, diast. 55 mm.Hg. Has been ill about a week. Tongue heavily coated, sputum frothy and blood-stained. Dyspnœa marked. Chest shows consolidation in right lower lobe, with diminished air-entry and much bronchitis in upper and middle lobes. In left lung dullness in lower lobe with much bronchitis. Heart normal in size, first sound poor at apex, and loud, well-propagated systolic bruit over the aortic area. Blood shows 15,000 w.b.c., chiefly neutrophils. Advise fixation abscess. 17th: Doing well, no cyanosis, and feels better. B.P., syst. 101, diast. 50; leucocytes, 17,200. On the 18th distinctly better;

temp. lower, pulse 94–104, B.P., 102–52. Chest shows signs of fluid at right base. Leucocytes 15,200. 20th: Temp. normal and patient does well, little cough or sputum; leucocytes 11,000. The further history was uneventful. The abscess was opened on the fourth day. It should be noted that in this case the number of millimetres of mercury attained by the systolic blood pressure was usually below the pulse-rate, so-called Gibson's rule, generally accounted a sign of marked gravity.

CASE 4.—Cpl. S., pyæmia, ulcerative endocarditis. On admission gave signs of left lower lobed pneumonia. Heart apex in left nipple line, first sound accentuated and short, at base a rough systolic bruit. Leucocytes 14,500. Later he developed hæmorrhagic blisters on hands and feet, from these smears showed staphs., streps., and diphtheroids, but cultures staphs. only. His condition steadily became worse and on the fifth day in hospital he developed large swellings under left clavicle and in the right buttock. He was now regarded as a case of pyæmia probably due to endocarditis, and a fixation abscess was given. The patient died, however, that night; the P.M. confirmed the diagnosis.

CASE 5.—Pte. H., knife wounds of thigh and abdomen, penetrating stomach. At the operation blood and stomach contents were cleaned out of the peritoneal cavity, and wound of stomach sutured. Later pyrexia, sweating, and rapid running pulse (about 128 per min.) with diarrhœa. Seen 12 days after the operation, patient was very ill, pale, breathless, and gave signs of consolidation in both lungs; sputum abundant and muco-purulent, loaded with pneumococci and streps. Next day was delirious and complained of abdominal pain; both wounds gave a discharge full of streps. Advised transfusion of blood to tide over the crisis, large doses of anti-streptococcal and anti-pneumococcal serum and a fixation abscess. The blood was not given until the next day, when patient was, if anything, worse. Two days later he was much better, and chest much clearer. The abscess was opened on the fifth day and the after-history was uneventful.

It is difficult to say what part the fixation abscess played in this case. (The case was reported at some length in the *Journal of the Royal Army Medical Corps* of March or April of this year; I have not read this account.)

CASE 6.—Pte. C., pneumonia; a marked alcoholic history. Admitted May 19th, 1920; seen next day. Consolidation of left lower lobe, much pleurisy, pale, collapsed, dyspnœa present, pupils very dilated. Pulse 110–110; B.P., syst. 105, diast. 72. Could not be examined fully: too ill to move about. On the 21st much better but chest signs, cough, and sputum persist. On the 22nd temp. again 104° F., pulse rapid and poor quality, chest shows areas of dullness in right lower lobe, consolidation persists in left side, and there is much pleuro-pericardial friction. On the 23rd very ill, pulse 120, is pale and is bringing up no sputum. On the 25th symptoms much the same but patient weaker. Fixation abscess. On 26th is a little better. Pulse 108; B.P., syst. 120. 27th: Pulse, 108; B.P., syst. 112, diast. 70. On the 30th abscess opened, general condition much better, colour good, sputum well brought up. Further history uneventful except for attacks of paroxysmal tachycardia during convalescence. For several days the syst. blood pressure was lower than the pulse-rate.

CASE 7.—Pte. B., aged 56, subacute bacterial endocarditis. On admission case was thought to be enteric or paratyphoid. Was running an irregular constant pyrexia, and the white corpuscles were only 3·200 per c.mm. On Sept. 17th, 1920, apex beat in L.N.L., a loud systolic bruit at apex, well conducted to axilla. On the 21st a soft systolic bruit, audible over aortic area. Temp. about 105° F. Blood culture gives staphs. and streps. On Oct. 5th (when I returned from leave) patient very yellow, but not jaundiced, numerous small purpuric spots on chest and neck, some

TABLE I.—*Blood Changes in Case 8.*

Date in 1920.	Total w.b.c.	Differential.							Arneth count.				
		Po.	S.L.	L.L.	Tr.	Eo.	Mst.	My.	I.	II.	III.	IV.	V.
Nov.													
15th	17,500	—	—	—	—	—	—	—	—	—	—	—	—
16th	28,600	—	—	—	—	—	—	—	50·0	38·0	14·0	2·0	0·0
17th	—	88·0	2·5	8·0	0·4	0·0	0·0	2·0	61·0	23·0	12·0	3·0	1·0
18th*	22,400	92·5	4·5	1·0	0·5	0·0	0·5	1·0	60·5	31·0	8·5	—	—
19th	34,000	83·0	7·5	6·0	0·0	0·5	0·0	3·0	57·0	33·0	59·0	0·5	—
20th	28,600	81·0	10·0	6·5	1·0	0·5	0·0	0·0	67·9	29·0	4·0	—	—
21st†	20,600	73·0	18·6	4·4	1·0	1·0	0·0	1·0	72·0	24·0	5·0	1·0	—
22nd	29,800	71·5	14·5	10·0	1·0	2·0	0·5	0·5	66·6	30·0	2·4	1·0	—
23rd	25,600	61·0	24·0	8·5	2·0	1·0	0·0	3·5	70·0	23·0	7·0	—	—
24th	18,600	58·0	23·0	15·5	2·0	1·5	0·0	0·0	50·0	38·0	11·0	1·0	—
25th	20,400	70·0	16·0	11·0	0·5	2·5	0·0	0·0	38·0	44·0	16·0	3·0	—
26th	17,200	70·0	9·0	17·0	1·5	1·0	0·0	0·0	52·0	34·0	11·0	3·0	—
29th	8,000	75·0	17·0	6·0	1·0	0·5	0·5	0·0	28·5	46·0	5·22	3·0	1·0

Remarks.—Nov. 22nd and 26th: 1 normoblast at each date.

TABLE II.—*Blood Changes in Case 9.*

5th	21,900	94·0	—	—	—	—	—	—	26·0	38·5	28·5	5·0	2·0
6th* ..	17,000	—	—	—	—	—	—	—	—	—	—	—	—
7th	15,400	—	—	—	—	—	—	—	48·0	40·0	—	—	—
8th	18,400	—	—	—	—	—	—	—	—	—	—	—	—
10th† ..	19,400	—	—	—	—	—	—	—	50·0	39·0	—	—	—
11th	19,200	—	—	—	—	—	—	—	—	—	—	—	—
12th	21,000	—	—	—	—	—	—	—	29·0	50·0	—	—	—
13th	18,600	—	—	—	—	—	—	—	30·0	36·4	22·4	3·6	1·2
14th	15,600	63·6	7·0	18·0	5·0	6·0	1·0	2·0	30·3	44·6	17·3	1·3	0·0
15th	13,500	50·0	4·6	65·0	4·6	3·0	3·0	0·0	35·0	38·0	21·0	5·0	1·0
16th	8,500	—	—	—	—	—	—	—	18·0	45·0	32·0	5·0	0·0
17th	8,400	61·5	17·0	18·0	0·5	2·0	1·0	—	28·0	41·0	27·0	3·0	1·0
19th	—	69·0	14·0	16·0	0·0	1·0	0·0	—	16·5	42·0	29·5	11·0	1·0

* Signifies the injection of turpentine. † Signifies the incision.

CASE 8.—Pte. J., pneumonia. Admitted Nov. 13th, 1920. Pneumonia right lower lobe. On the 18th patient very ill. Pulse 110–124, delirious. Heart sounds poor, first sound faint at apex; is cyanosed, brings up little sputum and tongue dry and fissured. Fixation abscess. On the 19th a little better, still some delirium. Temp. 100° F., pulse 90–112. 20th: Temp. normal, pulse 90–100; patient looks better, but tongue is still rather dry and coated. On the 21st temp. normal, colour good, but tongue still dry; pulse, 80–90; resp. still 31. On the 22nd better, tongue moist. On the 23rd temp. normal, but complains of pain in left axillary base, where there is some recent friction. The later history of this case is without interest. Table I. shows the blood changes.

CASE 9.—Gr. S., broncho-pneumonia. Patient had been ill for three days. On admission was of greyish colour and breathlessness, and cannot sit up on account of faintness. Pyrexia of hectic type, about 101° F., H.A.B. is half an inch to the left of L.N.L., a loud systolic mitral and a double aortic bruit present; Durosiez sign present, no Osler's nodes. On the 6th fixation abscess given. On the 9th looked very ill, leucocytes 7000. On the 11th leucocytes 7800. On the 13th abscess opened, leucocytes 7900. On the 15th signs of embolism of left kidney, pain, hæmaturia with numerous blood and granular casts. Leucocytes 5600. I next saw the patient on the 21st; general condition then much better, complexion pinkish, and patient could move about the bed, sit up or lie down without distress. Complained of weakness; temp. lower, but not normal. 22nd: Urine contains no blood, but still some granular casts. Patient an ex-Varsity man, very querulous and troublesome; considers he is being made the subject of experiments. Suppuration encouraged in abscess incision. On Nov. 2nd occasional pyrexia, is no longer improving, colour again becoming yellowish. A repetition of the fixation abscess was proposed, but the patient refused that or any other treatment. His condition became progressively worse and he died on the 13th.

had much dyspnœa with expiratory grunt. Florid herpes on lips and numerous moderate-sized petechiæ on upper part of trunk (patient was quite clean). Tongue dry and thickly coated, heart normal in size, first sound faint and prolonged. Pulse, 108; B.P., syst. 108, diast. 55 mm. Chest shows bronchitis all over, with signs of consolidation in middle and upper lobes on right side; absence of abdominal reflex on left side. On Nov. 6th temp. 104°, pulse 104–116; herpes extending, colour poor, and condition generally worse. Fixation abscess. 7th: Quieter, little pain. Temp. 102° F.; pulse, 104–116; B.P., syst. 112, diast. 60. On the 8th much better. Temp. normal, pulse 88; has no pain; is still a little cyanosed at times and chest signs persist unchanged. On the 10th abscess incised, does well. On the 15th asks to be allowed up; later stages without any interest. Table II. shows the blood changes.

In these last two cases the temperature fell in a rapid lysis, somewhat resembling the protracted crisis of ordinary lobar pneumonia; this sudden change in temperature and general condition might be attributed to a crisis. However, the pneumonias we were getting at that time were not resolving by crisis; the rule was a lysis which lasted three or more days. The ordinary kind of pneumonia, in which the condition was lobar and ended by crisis, did not reappear for some time afterwards. One or two other cases have been treated with the fixation abscess, but owing to incompleteness of data they have not been included; they did well and there were no other fatalities.

Summary.

1. The fixation abscess appears to be a powerful stimulant to leucocyte formation and possibly to phagocytosis. There are probably other factors in its action of which nothing is yet known.

2. The indications for this treatment are grave illness, especially of a septic nature, with evidence of defective resistance.

3. If a suitable site is chosen, and the other suggestions are carried out, the pain is not too severe.

4. Nine severely ill cases have been treated by this method, supplemented only by cardiac stimulants. Most of the cases were chosen for the treatment because, after due observation extending over several days, as a rule, it was considered that the patient was going downhill and that there was no hope of recovery with the usual methods of treatment. Of these cases three died only, and one of these died on the same day.

In conclusion, I have to thank the numerous M.O.'s of the Rhine Army for assistance in acquiring clinical notes, particularly Captain J. B. Woodrow, R.A.M.C., and Captain H. Storey, R.A.M.C., who were in charge of the wards where most of the cases were treated.

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A NOTE UPON THE SIGNIFICANCE OF DIGESTION LEUCOCYTOSIS.

BY D. NOËL PATON, M.D. EDIN., F.R.S.,
PROFESSOR OF PHYSIOLOGY IN THE UNIVERSITY OF GLASGOW.

(From the Institute of Physiology of the University.)

THE existence of a digestive leucocytosis, first recorded by Moleschott in 1854, is now generally admitted, but its significance is still much debated. Hofmeister,[1] in 1887, and Pohl,[2] in 1889, from experiments on dogs, concluded that it is due to an increased production of leucocytes in the lymphoid tissues of the intestinal wall. The latter investigator found that the leucocytosis follows the administration of protein, but not of fats and carbohydrates. Brasch,[3] in 1912, from experiments upon rabbits and dogs, concludes that the leucocytosis occurs after nucleic acid, egg albumin, fats, and carbohydrates. The amounts of each given were small, only one experiment with each is recorded (two with casein) and, except in the case of egg albumin, the leucocytosis was trivial. His results cannot be set against the more extensive studies of Pohl. Goodall, Gulland, and Noël Paton,[4] in 1903, confirmed the existence of a very marked leucocytosis in dogs following the taking of from 250 to 500 g. of lean meat, but found that there was no difference between the number of leucocytes in the arteries and in the veins of the intestine, thus showing that the intestinal wall is not the source of the leucocytes.

Later, Noël Paton and Goodall[5] showed that the leucocytes are increased by emigration from the bone marrow, probably by a process of chemiotaxis, as had been suggested by Ascoli in 1901. The view then expressed was that the leucocytes streamed to the intestine and then took up the products of protein digestion to liberate them later in the blood. Such a conception is not opposed to the findings of Folin and Denis, van Slyke and Abel that the amino-acids in the blood are increased by protein feeding. The leucocytosis must have some physiological significance, and the most probable action seems to be in playing a part in the transference of the products of protein digestion from the intestine. It is, of course, possible that it may be a protective process to prevent the over-flooding of the plasma with amino-acids.

Halliburton,[6] in 1909, in replying to a criticism by Pavy, gave a calculation to show that the number of lymphocytes, which Pavy had maintained were the acting cells, is insufficient to carry the proteins digested and absorbed in an ordinary meal. He takes a man of 80 kilos. and supposes that he has 4 kilos. of blood with 40 per cent. of corpuscles—i.e., 1600 g. He takes the ratio of white to red as 1 in 500, which gives 3·2 g. of leucocytes. He accepts for his argument that Pavy's conclusion that lymphocytes alone play a part is correct and he concludes that there is only about 1 g. of lymphocytes in the blood. Even if the amount is doubled in digestion he argues that 2 g. of lymphocytes cannot tackle the burden which every meal must impose upon them. This method of calculation seems fallacious, not only because it takes lymphocytes alone into consideration, but because it neglects the rate of blood-flow through the intestine. What has to be considered is the volume or weight of leucocytes—for all types of white cells are increased—which pass through the wall of the intestine during the six hours of active digestion, not the total weight of leucocytes in the blood. As the result of Cybulski's[7] observations in 1906 it may be taken that in a dog of 10 kilos. some 9000 c.cm. of blood pass along the portal vein per hour. Burton Opitz[8] gives an average of 9864 c.cm. in an average weight of dog of 16·6 kilos. This gives roughly about 54,000 c.cm. in the six hours of digestion.

The blood of the dog during digestion, according to our observations, contains about 30,000 leucocytes per c.mm.—i.e., 30,000,000 per c.cm. The increase is sometimes as high as 140 per cent. Taking the diameter of the leucocyte at 10μ and assuming it to be spherical, its volume may be calculated as 0·00000052 c.cm.—i.e., 520×10^{-9}. Hence the volume of leucocytes passing through the intestine in the six hours of digestion is $54{,}000 \times 30 \times 10 \times 520 \times 10^{-9}$ or 842·4 c.cm. which, taking their specific gravity as that of water, gives 842·4 g., an amount amply adequate to deal with the largest possible absorption of protein.

The ratio between the volume of the leucocytes and that of the blood is $\frac{842{\cdot}4}{54{,}000}$, or 1·6 per cent., a percentage such as might be expected during a leucocytosis of about 100 per cent.

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Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

OBSTRUCTION OF THE PELVIC COLON BY THE PEDICLE OF AN OVARIAN CYST.

BY G. S. WOODMAN, M.B., B.S. DURH., F.R.C.S. EDIN.

THE notes of the following case, in which the obstruction was caused in a remarkable manner, seem to merit publication.

On August 28th, 1921, I was called by a local Muslim doctor to see his mother-in-law, aged 55, who was suffering from symptoms indicating an obstruction of the bowel, incomplete in character. The previous day she had had a sudden attack of moderately severe pain in the lower abdomen, followed once by vomiting. An enema given in the evening had resulted in the passage of a little fæces and flatus, but did not relieve the pain. When I saw her the abdomen was slightly distended, particularly over the cæcal and sigmoid areas; tenderness was not marked, and there was no rigidity. Pulse 80; Temp. normal. She gave no history of genito-urinary trouble.

The castor oil ordered was returned and an enema with turpentine produced a small motion without passage of flatus. The following day her condition was much the same, and she was removed to hospital for further observation and in case the necessity for operation should arise. A further enema resulted in the passage of considerable flatus. During this and the following day her condition was chiefly remarkable for variation in severity of local symptoms. Pulse and temp. remained unelevated. The spasms of pain varied in intensity and duration, and frequent enemas only occasionally produced flatus. Abdominal distension was on the whole less marked. A small stool was passed on the 30th after an enema. On the 31st the pulse rose to 96, temp. to 99° F., and her general condition was obviously worse. She complained bitterly of increase of pain after enemas. I advised a laparotomy but first made a vaginal examination. This revealed an ill-defined lump on the right side. The fundus uteri could not be felt.

On opening the abdomen under spinal anæsthesia (stovaine) by a sub-umbilical incision, the omentum was seen passing down to become attached to a right-sided ovarian cyst about the size of a cricket-ball. The uterus was displaced to the left and the pelvic colon was found to be ensnared by the cyst pedicle in a remarkable manner. The pedicle, under considerable tension, about the thickness of the index finger, and showing several twists, passed from the uterus posterior to obstructed loop, then over the latter from behind forwards, and finally to the left and posterior to its proximal portion, emerging under cover of this to reach the base of the cyst. The cyst was lying horizontally with its apex to the right and pointing downwards slightly. The loop of colon was moderately distended and showed a fairly pronounced ring at the point of constriction. After partially adherent omentum had been ligatured and divided the obstruction was first relieved by division of pedicle between ligatures at the point where it appeared from behind the loop, and the cyst removed. The remaining (proximal) portion of pedicle was then ligatured and removed from its uterine attachment. The broad ligament on side of cyst was extremely rudimentary. The abdomen was closed in layers without drainage. Apart from a rise of temperature on third and fourth days due to malaria, which yielded promptly to intramuscular injections of quinine, patient made an uneventful recovery.

Remarks.

The cyst was incised after removal and proved to be a dermoid containing a large quantity of hair in about 12 oz. of viscid dark yellow fluid. The total length of the pedicle was about 8 in. It was dark red in colour due to extravasation of blood, and presented an unusual feature in that its diameter was uniform throughout. How the cyst and its pedicle came to establish the relations found at operation it is difficult to guess, but it seems reasonable to suppose that the omentum was to a large extent responsible for their maintenance. The adhesions were recent and probably followed twisting of pedicle. The abnormal length of the pedicle must, I think, be regarded as the primary factor in the causation of the obstruction, and no doubt the weight of the cyst, aided by gravity, prevented the bowel escaping from the noose.

I wish to thank the Director of Health Services in Iraq for permission to publish these notes.

Mosul, Mesopotamia.

A CASE OF ANASTOMOTIC ULCER FOLLOWING GASTRO-ENTEROSTOMY FOUR YEARS PREVIOUSLY: TRANSGASTRIC EXCISION AND RECOVERY.

BY J. WILMOT ADAMS, M.B., B.CH. CAMB., F.R.C.S. ENG.,

STRAITS SETTLEMENTS MEDICAL SERVICE; SURGEON, GENERAL HOSPITAL, PENANG.

THE following case is of interest owing to the rarity of the condition and method of treatment.

The patient, a Chinese house servant, was admitted to hospital on August 10th, 1921, complaining of abdominal pain, which had been present for ten days, and was increased by taking food of any kind. The past history was as follows. In May, 1917, he was operated on in this hospital for abdominal pain. This operation was found to have been gastro-enterostomy, after which he was free from pain for about three years. In the previous January he had had an attack of pain, accompanied by vomiting and hæmatemesis. This pain was treated medically, and he improved considerably, but since then he has never felt perfectly comfortable after taking food.

On admission the abdomen was not distended nor was there any general tenderness. The lower half of left rectus was rigid, and there was pain on palpation just below the umbilicus on left side. He was treated medically at first, but both on day of admission and two following days there were very severe attacks of pain which, when in progress, completely prostrated him. After the first of these attacks I was asked to see him, and in view of the past history and situation of pain, which was always low down on left side, I made a tentative diagnosis of anastomotic or jejunal ulcer, probably on the verge of perforation.

On account of the severity of attacks of pain an exploration was decided on, and this was performed on the 13th. There were scarring and thickening, but no sign of any recent trouble at the site of old ulcer in the first part of the duodenum. The gastro-enterostomy was a posterior no-loop, anatomically correct, the stoma admitting two fingers. There were a few old but slight adhesions around the junction; just on the stomach side of the opening could be felt a circular thickening the size of a shilling. From the right extremity of the greater curvature a thick adhesion ran to the old incision. This adhesion was sagging and not tense, and was removed. The stomach was then opened anteriorly midway between and parallel to the two curvatures and gastro-enterostomy opening, and parts immediately adjacent invaginated through by pressure from assistant's finger below. The thickening proved to be a chronic ulcer. The mucosa adjacent to crater of ulcer bled very freely at the slightest touch. The ulcer was excised with scissors down to, but just not perforating, peritoneal coat, and the raw area thus produced was closed by interrupted catgut sutures, not including the peritoneal coat. The incision in anterior wall of stomach was closed in the usual way with two continuous catgut sutures.

Patient stood the operation well; recovery and convalescence were uneventful, except for an acute bronchitis.

He was allowed any fluid except milk from the start, and was discharged on Sept. 23rd on full native (Chinese) diet, with no gastric pain or discomfort.

Remarks.

The condition and method of treatment are both rare. Only one case treated in this way is mentioned in the last edition of Sir B. Moynihan's "Abdominal Operations." An unusual length of time, roughly three years, elapsed after the gastro-enterostomy was done before any symptoms of ulceration appeared. On examination of the ulcer after removal a silk knot was found embedded in the under-surface of the crater of the ulcer, lying just beneath the peritoneal coat. The relief afforded by the operation was striking.

I am indebted to Dr. A. L. Hoops, Principal Civil Medical Officer, Straits Settlements, for permission to publish this case.

COLLOIDAL MANGANESE IN HODGKIN'S DISEASE.

BY ROBERT SAMUT, M.B., C.M. EDIN.,
PROFESSOR OF PATHOLOGY, MALTA UNIVERSITY.

I PLACE these two cases on record as I do not think that hypodermic injections of colloidal manganese have been tried before in this disease, and in the hope that the preparation may be given a wider trial by others.

CASE 1.—J. M., aged 27 years, a clerk, reported sick some months ago, complaining of progressingly increasing weakness and inability to perform his duties. He was the subject of profound anæmia, and presented two large swellings, one on each side of the neck, so large that they interfered with the wearing of any kind of collar except a low, soft "Shakespeare." Similar swellings, though not so marked, existed in the groin on either side. These swellings proved to be masses of lymphatic glands, so crowded together as to appear one mass; but on palpation it was found that they retained their individuality and were slightly movable, though movement was hampered by their reciprocal compression. All the glands were firm, and nowhere did they show any tendency to softening. The spleen was slightly enlarged, and the patient complained of a slight, dull, aching pain over the left hypochondrium and of tenderness over the epigastric region. The erythrocytes were diminished to 3,200,000 per c.cm. at the first examination, and the hæmoglobin was reduced to 68 per cent. (colour index 1·06). Microscopically there was a slight increase in the small lymphocytes (30 per cent.). Otherwise the blood picture was normal.

I diagnosed Hodgkin's disease, and started cacodylate of sodium (0·10 g.) injections at once. After 24 injections, there being no apparent diminution in the size of the tumours, or any improvement in the patient's general condition, I determined to change the treatment, and substituted injections of colloidal manganese for those of sodium cacodylate. Improvement followed after the first eight or ten injections, and was so steady that, after three months' treatment, the glands had practically disappeared. One of the left cervical glands remained slightly swollen when the patient had a slight attack of appendicitis. The attack was not such as to call for immediate operative interference, and, in about a fortnight, the patient returned to his work. A few days after I heard that he had had an extremely severe attack of appendicitis during the night. He had been seen by the D.M.O. and transferred to the Central Hospital for immediate operation. A large appendicular abscess was evacuated that same night; there were signs of acute peritonitis. The patient sank gradually, and died four days after the operation.

CASE 2.—About four months ago another case of Hodgkin's disease came under my care. The patient was a female, aged 22 years. The clinical and blood pictures were exactly the same as in the previous case. The patient had been treated in Italy for several months with no apparent improvement. The cervical glands were very large and firm. The spleen was not appreciably enlarged. I had been so impressed with the result obtained by the use of colloidal manganese in the first case, that I determined to start the same line of treatment in this case also. A marked improvement appeared after the first few injections. I saw the patient at long intervals, and each time was struck by the diminution in size of the glands. It is now some weeks since I last saw the patient; there was absolutely no trace of the swollen glands. The patient's colour has improved enormously, and her general condition is what she describes as "normal."

Three weekly injections were given in both cases. They were given intramuscularly in the gluteal region, and were absolutely painless.

A CASE OF CONGENITAL TUMOUR IN A BABY.

BY R. HANDFIELD-JONES, M.D. DURH., M.R.C.S.

THE following case is of sufficient interest to merit record:—

Baby X, aged 14 months, was admitted to the Children's Hospital, Shanklin, from Cowes.

History.—The mother had noticed a swelling in the left axilla for some months, which had lately begun to grow rapidly, but was not painful and did not appear to worry the child in any way.

Condition on admission.—The growth was about the size of a cocoanut, lobulated, not adherent to the skin; it had a tense feeling and felt harder in some parts than others; it extended from the clavicle downwards for about 3 to 4 in., passed backward into the axilla, reaching almost to the anterior border of the scapula. The growth appeared to come from under the clavicle just between the coracoid process and the acromion. The child was in perfect health and condition; indeed he was one of the bonniest babies I have ever seen, and he did not mind prolonged examination of the growth. As it was growing rapidly we decided to remove it. On Nov. 30th, 1919, my partner, Dr. J. Cowper, operated, and I gave the anæsthetic.

Operation.—Duration, 1½ hours. The growth, which turned out to be a multilocular cystic one with hæmorrhage into two of the largest cavities, required very careful dissection to separate it from the important structures around; part of the pectoralis major was spread out over it and adherent. The growth appeared to originate from the bursa under the coraco-acromial ligament. One or two large veins had to be ligatured, otherwise the bleeding was not severe, which was fortunate in so young a subject.

The patient made an uneventful recovery, healing practically by first intention, and was discharged on Dec. 23rd, 1919.

Shanklin, I.W.

Medical Societies.

LIVERPOOL MEDICAL INSTITUTION.

THE fifth ordinary meeting of the session was held on Dec. 22nd last, Dr. R. W. MACKENNA, the Vice-President, being in the chair, when Dr. C. J. MACALISTER read a paper on

Some Relationships between Disease and Reversionary Characteristics.

He pointed out that man's present stage of development had probably been acquired owing to conditions of environment and opportunity by which his ancestors were surrounded. This had led to his having structural and physiological complexities presenting considerable variation and sometimes involving deviation from perfection. His habits as to food had undergone extraordinary changes, and it was probable that the conditions which had rendered him capable of metabolising any type of food, animal or vegetable, must have resulted in great developmental changes. Having defined what was meant by reversion to type, Dr. Macalister spoke of anatomical and physiological imperfections which represented reversion to types characteristic of some of those ancestries from which he was originally evolved, limiting his observations to the metabolic side of the question. Variations occurred sometimes towards the carnivorous type of metabolism, sometimes towards the vegetarian, and he suggested that the stock from which man originated when on the carnivorous side might be regarded as having a latent vegetarian metabolism, whereas on the vegetarian side it would be a latent carnivorous one. This hypothesis might be used to explain the adaptability to new dietetic conditions in early stages of evolution. Dealing with the functional capacity of the organs of metabolism, he suggested that whereas the majority of people were furnished with organs adequate in size for dealing with a variety of food, some had too small a liver or pancreas, or kidneys unable to eliminate certain materials, or in which general eliminative functions were apt to be slow. Such people probably represented variations to ancestral types of metabolism, and disease might be avoided by adherence to diets corresponding to the type to which they belonged. If personal idiosyncrasy were met, there was no reason why variants should be regarded as abnormal, or should suffer ill-health if taught to diet themselves in accordance with their physiological requirements. Dr. Macalister concluded with a reference to racial reversions.

Dr. E. CRONIN LOWE read a paper upon the

Rationale of Vaccine Therapy,

illustrated by diagrammatic lantern-slides showing the part played in the maintenance of a natural immunity by endocrine glandular functions. Vaccine

therapy was not an alternative mode of treatment, but an accessory one. Dr. Lowe attempted to differentiate the comparative usefulness of detoxicated and sensitised vaccines in various conditions, and to assess the importance of bacterial findings by blood-count pictures and serological tests. Stress was laid upon focal reactions as an essential guide to dosage and interval in vaccine treatment.

DEVON AND EXETER MEDICO-CHIRURGICAL SOCIETY.

A MEETING of this Society was held at the Royal Devon and Exeter Hospital on Dec. 15th last, Dr. P. H. STIRK, the President, being in the chair.

The PRESIDENT read a paper on the

Coöperation of the General Practitioner in Preventive Medicine

in which he traced the advances made in this branch of medical science from early Victorian days up to the present time, narrating the transition from the old Poor Law Board through the Local Government Board to the present Health Ministry. He paid tribute to the work of Sir John Simon, Sir George Buchanan, Sir R. Thorne Thorne, Sir W. H. Power, and Sir Arthur Newsholme, and others who had done much to establish the medical officers of the Board in a fitting position. Dr. Stirk went on to make a survey of the various health services. The death-rate was steadily declining, but the birth-rate remained dangerously low. Infant mortality was the lowest on record, but loss of life should be still further reduced. Epidemic diseases had fallen on the whole and there was evidence of victory over certain infectious diseases. Tuberculosis, measles, acute rheumatism, and influenza were still prevalent, and with venereal diseases leading to much disablement and mortality. Sanitation had improved, but housing accommodation was still deficient. The findings of the school medical officers in respect of physical and mental impairment had been confirmed by the examination of recruits. Returns showed that one half of the insured people claimed or received treatment and that time lost from unemployment exceeded 270,000 years per annum, largely through preventable disease. Dr. Stirk then spoke of the wider view now taken by State medicine in the work of the maternity and child welfare centres and tuberculosis and V.D. clinics. He pleaded for a spirit of coöperation in the general practitioner who might be apt to consider the public health authority as an opponent. He advocated education of the public in the early signs and symptoms of disease by the family doctor, whose opportunities and special knowledge qualified him to undertake such duties. Dr. Stirk approved the employment of part-time medical officers in clinical work, but he considered it necessary for administrative work to be on a whole-time basis. All medical work done in connexion with school children should be, he concluded, under the direct control and administration of the Ministry of Health.

Discussion.

In the discussion which followed, Dr. G. G. GIDLEY spoke of the educative work now being done by the women's institutes, several of which had been established in Devon.—Mr. A. L. CANDLER regretted the lack of physiological teaching in public schools and paid a tribute to the work of the boy scouts and girl guides. He envied the powers possessed by the military arm in the control of infection.—Dr. R. M. BARROW thought much tact and skill in argument would be required in explaining to the public how to benefit by the teaching suggested in Dr. Stirk's paper.—Dr. PERIERA GRAY was of opinion that the curative side of medicine should be relegated to the practitioner and the preventive to the public health official.—Dr. R. V. SOLLY inquired at what age-limit medical supervision should terminate and to what extent income should be a qualifying factor in the case of children so supervised.—Dr. DELPRATT HARRIS advocated the principles of eugenics.—Dr. F. A. ROPER discussed public health from the wider point of view of national health.—Dr. H. JONAS said that while the public health service must increase either in whole-time or part-time officials, in his opinion efficient administration was impossible on a part-time basis. There must be unity of control.—Dr. G. ADKINS (M.O.H., Devon) considered that it was impossible for a man to cure and prevent disease. The whole-time official should coöperate with the curative man, as for example, in the diagnosis and treatment of ringworm, adenoids where they met on common ground; without coöperation disputes would inevitably arise.—Dr. L. P. BLACK, as a part-time M.O.H., had observed the lack of precautions as to isolation taken subsequent to a notification. He discussed the series of inspections now in vogue from the pre-natal period to adolescence.—Dr. W. HORTON DATE (deputy M.O.H., Devon), said that the circular returned by the school inspector was so worded as to give no reason for the practitioner to take exception when investigations of the throat and nose were suggested in a given case. There was much yet to be done in the way of educating both the public and the teachers in our schools also.

The PRESIDENT in his reply quoted Sir G. Newman, who had stated that the care of the family should not be intermittent at times of illness, but an educative interest should be taken by the general practitioner at all times. He advocated the school nurse taking the position of school attendance officer where this was possible.

ABERDEEN MEDICO-CHIRURGICAL SOCIETY.

AT the December meeting of this Society, Mr. J. SCOTT RIDDELL, the President, in the chair, Prof. C. R. MARSHALL gave an address on the subject of

Convulsions.

He said that convulsive movements, considered as involuntary contractions of volitional muscles of central origin, were of the same order whether they were true tremors, as in paralysis agitans, or typical convulsive seizures, as in epilepsy. Prof. Marshall dealt only with movements of cerebral origin and stated that the motor area possessed no automatism. He spoke briefly of the causes of convulsions and illustrated the effects of a slowly acting, cerebral, convulsant poison as an example of a uniformly diffuse stimulus. He regarded the flaccidity of the muscles in chorea as an important factor in the characteristic movements. Of the difficulty of explaining the commencement of epileptic attacks, he said that powerful psychical stimuli did not necessarily cause them, but he suggested that they might possibly be initiated by psychical stimuli which were associated with altered vagotonus. In nocturnal epilepsy such psychical stimuli might occur in dreams.

On Dec. 16th the annual dinner of the Society was held in the Society's rooms, when 68 members and guests assembled.

LIGUE NATIONALE CONTRE LE PÉRIL VÉNÉRIEN.—A society for combating venereal disease has recently been started in Belgium under this title. Its objects are stated as follows: To unite, coördinate, and set in action all the moral and social forces which may avail in the fight against venereal disease; to encourage, maintain, and, if necessary, create and develop societies and institutions for the prevention and treatment of these diseases; to inform, through intensive propaganda, all classes of the population of the dangers consequent upon these diseases, the methods of treatment, and the means of preventing their spread, and of the rules of moral conduct which ensure protection from them; to develop medical instruction both within and without the universities; to assure the foundation of societies for aiding the victims of venereal disease; to combat charlatanism and, in general, all those causes which make for the extension of the venereal endemic. The organisation of the league comprises three sections (1) medical, (2) moral propaganda, (3) social welfare. One of the leading features of its activities will be the attention paid to popular instruction.

Reviews and Notices of Books.

BOWEL DISEASES IN THE TROPICS.

By Sir LEONARD ROGERS, C.I.E., M.D., F.R.C.P., F.R.C.S., F.R.S., I.M.S. (ret.), Extra Physician for Clinical Research, and Lecturer in Tropical Medicine, London School of Tropical Medicine. London: Henry Frowde and Hodder and Stoughton. 1921. Pp. 475. 30*s*.

UNDER the title "Bowel Diseases in the Tropics" Sir Leonard Rogers has combined two previous works entitled respectively "Cholera and its Treatment" (1911) and "The Dysenteries, their Differentiation and Treatment" (1913), together with a chapter on Sprue, into one volume, which forms a suitable companion to "Fevers in the Tropics" by the same distinguished author. The new book will be welcomed by students and practitioners, not only in India, but elsewhere, since it contains a condensed account of original methods of treatment with which the name of Rogers will always be associated; they will find all the latest information upon the theory and practice of hypertonic salines in cholera and of emetine in the treatment of amœbiasis.

From the standpoint of a text-book it must be admitted that the book suffers from the unequal manner in which the subjects are treated; cholera and amœbiasis have no less than six chapters devoted to their consideration, the pages being loaded with tables of figures and statistics. Bacillary dysentery, a widespread, fatal, and important bowel disease of the tropics, is dismissed in 47 pages, in contrast to the 201 devoted to cholera. Hill diarrhœa and sprue are considered in one chapter of 22 pages. However, there can be no doubt as to the permanent value of this treatise to tropical workers throughout the world, even though the diseases are regarded chiefly from an Indian point of view. A few minor inaccuracies occur. In the preface allusion is made to the *Bulletin of Tropical Medicine*, while the real title of the useful publication referred to is the *Tropical Diseases Bulletin*. There are some curious spelling misprints—on p. 213 Kuen for Kuenen, on p. 233 Losch for Lösch, on p. 435 Heterotrica for Heterotricha, Tricomonas for Trichomonas, Mesneli for Mesnili, on p. 437 Shistosoma for Schistosoma. And one or two statements as to the prevalence of dysentery during the war may not receive general acceptation; for instance (p. 213), that 80 to 90 per cent. of army cases of dysentery seen in Egypt in the early part of the war were benefited by emetine, although later it was found that the bacillary type prevailed.

The six coloured plates illustrating the pathological appearances of the dysenteries which adorn the volume are really beautifully executed, and the value of the section on amœbiasis has been greatly enhanced by the inclusion of Dobell's plate of the amœbæ of the human intestine.

A GUIDE TO URINARY DISEASES.

By ADOLPHE ABRAHAMS, O.B.E., M.D., M.R.C.P., Physician to the Royal Chest Hospital; Assistant Physician to Westminster Hospital; and A. CLIFFORD MORSON, O.B.E., F.R.C.S., Surgeon to Out-patients, Hampstead General Hospital; Assistant Surgeon, St. Peter's Hospital for Urinary Diseases. London: Edward Arnold and Co. 1921. Pp. 126. 9*s*.

IT is a welcome innovation to see a physician and surgeon combining to write a text-book on urology. The present volume is written for the practitioner so that "he may identify a lesion from the symptoms which are present"—a difficult aim without the instrumental skill which the general practitioner is assumed not to possess. Still, inasmuch as the practitioner of to-day is an individual of high average medical intelligence and knowledge, even if he cannot himself carry out intricate clinical or pathological procedures, he at least desires to know how they are done and upon what principles they are based; he expects more information in a monograph than he can glean from the standard text-books of medicine and surgery and he may be disappointed not to receive it. The simple, pleasant style in which the authors have set forth the elements of urinary disease will nevertheless appeal to him, for, with a minimum of trouble, he can determine when to consult larger works and when to call in the expert. The recommendations are based upon sound current teaching.

SURGICAL TUBERCULOSIS.

Diagnostik und Therapie der Knochen und Gelenktuberculose. Mit besonderer Berüchsichtigung der Theorie und Praxis der Sonnenbehandlung. Von Dr. EUGEN KISCH. Leipsic: F. C. W. Vogel. 1921. Pp. 284. M.120.

THIS book is an interesting reflection of the admirable work done by the Bier school of surgeons in the non-operative treatment of surgical tuberculosis under difficult conditions. Dr. Kisch evidently believes light to be the dominant factor in treatment, but he also lays stress on the use of passive hyperæmia, which is applied even to the pelvis and head by means of constricting bands of thick rubber tubing applied round the abdomen or neck. As an accessory iodides are highly commended, and it is claimed that, besides having a specific influence on the tuberculous process, they favour the absorption of cold abscesses; passive hyperæmia by delaying elimination is said to result in considerable increase in the local action of this drug. For adults a daily total of 3·25 g. of sodium iodide is prescribed.

The greater part of the book is devoted to the diagnosis and treatment of the various localisations of tubercle in bones and joints, the utility of this section being much increased by the inclusion of numerous admirable photographs and skiagrams. The apparatus used is chiefly taken from Rollier, but has in several cases been made even lighter than that used by the latter. The clinical results obtained at Hohenlychen well illustrate the recent tendency to look on a "good solid ankylosis" as a comparative disaster, rather than the best that could be hoped for in surgical tubercle. In hip disease, for example, we find that of the cases discharged as healed, only 8·6 per cent. were ankylosed; against this we have 37·9 per cent. with normal and 24·1 per cent. with but slightly reduced function. These results, it should be noted, include a large proportion of septic cases. That light has a marked action in favouring the spontaneous absorption of tuberculous sequestra has long been the contention of advocates of this treatment. Dr. Kisch illustrates this action by a series of diagrams taken from X ray plates, from which it appears that sequestra, the size of a haricot bean, may be completely absorbed without operative interference in a period of time varying between six and twelve months. Not content with the five or six months of the year during which heliotherapy may be practised in Central Europe, Dr. Kisch has looked for a substitute for sunlight for use during the long winter months. In this search he was guided by the idea that it is to the heating action of the sun's rays that both pigmentation and curative effect are due; the substitutes chosen, the Osram lamp and the oxy-acetylene flame, are both rich in radiant heat. The previous conception that the ultra-violet rays are the most important factor in determining pigmentation is refuted by Dr. Kisch on the ground that he has obtained this effect with sources of light which do not contain these highly actinic rays. It is a pity that the spectra of the Osram lamp and of the oxy-acetylene flame are not given, as the possibility that these sources of light contain enough ultra-violet rays to produce pigmentation cannot be excluded. Other evidence is strongly in favour of solar pigmentations being almost entirely due to ultra-violet rays.

Dr. Kisch does not appear to be aware of the work either of Leonard Hill in this country or of Sonne in Denmark, but his conclusions are all the more interesting on that account, as the clinical experience of Hohenlychen gives independent support to the work of these two investigators. One is encouraged to hope that the highly penetrating visible rays of the solar spectrum will in the near future receive careful study from the physiological as well as from the physical point of view, and that a wider therapeutic application may be granted them.

GASTRO-ENTEROLOGY.

A Manual of Diseases of the Stomach. By WILLIAM MACLENNAN, M.B., Hon. Consulting Physician, Western Infirmary, Glasgow. London: Edward Arnold and Co. 1921. Pp. 392. 21*s.*

IN this book Dr. MacLennan has set out in systematic manner the information which he has for many years given to his students in the wards, and may be congratulated on the arrangement, illustration, and indexing of a very useful little volume. Its first section, forming nearly half the whole book, deals with the anatomy, physiology, and chemistry of the subject, with special chapters on clinical and laboratory methods of examination. The chapter on physiology omits a good deal of relevant and important matter; thus on p. 18, in discussing the effects of hydrochloric acid on gastric motility, Dr. MacLennan makes no reference to the classic work of Cannon on the acid control of the pylorus, though his remarks on achlorhydria, in a later chapter, make it clear that he is fully conversant with this work. Similarly the chapter on Test-meals would be improved by the exclusion of several laboratory methods which are admitted to be of doubtful value, and their substitution by fuller accounts of the various fractional methods of gastric analysis to which Dr. MacLennan makes only passing, although favourable, reference. The sections dealing with diseases of the stomach are admirably arranged, and contain full descriptions of many of the various methods which have been elaborated for the early detection of such conditions as carcinoma. More attention might, with advantage, have been directed to recent English and American work in the field of gastro-enterology: detailed accounts of the Lenhartz and Leube-Ziemssen treatments of gastric ulcer are of value, but the student should be made equally aware of those admirable schemes associated with the names of Sippy and Smithies. We regret, too, that Dr. MacLennan devotes no more than a few lines to the surgical treatment of cancer of the stomach, but a few errors of omission can readily be forgiven in a volume which gives so much valuable information in so compact a form.

Diseases of the Digestive Organs. Third edition. By CHARLES AARON, Sc.D., M.D., F.A.C.P., Professor of Gastro-enterology and Dietetics in the Detroit College of Medicine and Surgery. London: H. K. Lewis and Co. 1921. Pp. 924. £2 10*s.*

IN this book Prof. Aaron gives a full and clear account of the many new forms of clinical and laboratory investigation which have served to make many American physicians famous for their diagnosis and treatment of alimentary disorders. The descriptions of laboratory technique, the tables showing the composition and dietetic value of various foods, the accounts of the less common pathological conditions of the alimentary canal, such as diverticulitis of the colon, or œsophageal spasm, all combine to form a volume so valuable that the critic is disarmed at the outset. But one doubt arises: does this exhaustive work rest on a very secure foundation? The first chapter, devoted to the physiology of digestion, reveals once again the short distance which the physiologist has so far travelled, and the length of the road that stretches in front of him. Prof. Aaron shows on occasion a tendency too readily to accept current physiological hypotheses, whilst at other times he omits to mention facts which have a greater basis of experimental support. Thus, on p. 57, he appears to give whole-hearted acceptance to the hormone theory of pancreatic secretion, whilst in the following pages he appears to neglect the importance of the effect of bile salts in lowering surface-tension, and treats the problem of absorption with an unnecessary vagueness.

Of all branches of medicine, gastro-enterology is the one where the physician encounters disorders of function oftener than anatomical disease, and it is chiefly by an increase in our knowledge of normal alimentary function that advances in treatment will come. Prof. Aaron's excellent descriptions of motor neuroses, sensory neuroses, and secretory neuroses of the stomach would have a greatly enhanced value if they were prefaced by an account of modern work on gastric sensation and some description of the experimental studies of his compatriot, A. J. Carlson. However, the work is clear, well arranged, and so nearly complete that it can be recommended as very valuable to the practitioner who wants a review of modern ideas on this rapidly growing section of modern medicine. The book contains 164 engravings, 48 reproductions of radiographic plates, and 13 coloured illustrations.

SURGICAL TREATMENT OF NON-MALIGNANT AFFECTIONS OF THE STOMACH.

By CHARLES GREENE CUMSTON, M.D., and GEORGES PATRY, M.D., Lecturers at the University of Geneva. With an Introduction by Sir BERKELEY G. A. MOYNIHAN, K.C.M.G., C.B., M.S. London: William Heinemann. 1921. Pp. 349. 15*s.*

THE literature of gastric disease and its surgical treatment is so vast, and the views set forth by surgeons during the last 20 years have been so divergent, that a work of this kind is a welcome addition to the bookshelf; for, by carefully sifting the evidence and bringing to bear upon it a large active experience, the authors have been able to set forth conclusions which bear the stamp of impartiality. They have no new operative procedure to extol, there is no special pleading for a particular method, but they do show in what direction progress may be looked for in this difficult subject. A surgeon who reads the book in the same unbiassed critical spirit (for all the conclusions cannot be accepted without reserve) will certainly profit from the reading. Details of operative procedures are not described, and this is rather a disadvantage when, for example, the treatment of gastric dystopia is discussed. The English reader, too, is not used to recognising the posterior no-loop gastro-jejunostomy under the name of von Hacker's operation. The authors emphasise the necessity of recognising the nervous dyspepsias in order to refrain from operating, but they do not explain how to arrive at a correct diagnosis. Indeed, diagnosis is not touched upon at all: this detracts somewhat from the value of the work, for diagnosis of gastric disease is not so exact as is currently believed. The rest of the book is so good that the authors' summary of this part of the subject would be worth reading, and we venture to hope that it may be included in a future edition.

BIOCHEMISTRY.

The Chemistry of Colloids and Some Technical Applications. Second edition. By W. W. TAYLOR, M.A., D.Sc., Lecturer in Chemical Physiology at the University of Edinburgh. London: Edward Arnold and Co. 1921. Pp. 332. 10*s.* 6*d.*

Dr. Taylor's book has now appeared in its second edition, a circumstance indicating its general utility and the interest of numerous workers in the subject of colloids. The main features of the book are not altered, but essential new matter has been incorporated, with such changes in previously accepted theory as have been brought about by new experimental work. There are also corrections in relation to historical matter. As before, the contents are arranged in four parts—general properties, prepara-

tion, adsorption, application, more than half the book being devoted to the first two subjects. The chapter on the properties of gels and the section on adsorption are perhaps the most important, for they deal with what may be called the natural colloids, such as gelatin, in contradistinction to the artificial colloids, such as colloidal silver, ferric hydroxide, and so forth. Artificial colloids have much simpler properties which do not extend to the natural group. A longer and clearer explanation of this latter type would be welcome to medical readers who wish to follow the details of life processes.

The Physical Properties of Colloidal Solutions. Second edition. By E. F. BURTON, B.A. Cantab., Ph.D. Toronto, Associate Professor of Physics, University of Toronto; Research Student of Emmanuel College, Cambridge. London: Longmans, Green and Co. 1921. Pp. 221. 12*s.* 6*d.*

THE domain of the colloid is becoming of more and more interest and importance both in medical and technical directions. The subject advances the more surely for its slowness, and we need not regret that Dr. Burton's book has not been greatly enlarged in this edition. The introduction to this volume is in a peculiarly happy vein, and the interest of the reader in the very varied aspects of colloidal properties is quickened throughout by Dr. Burton's attempt to give not only a pictorial view of colloids as they exist, but also a glimpse into the forces which keep these systems in equilibrium. He points out that the final permanent size of the particle seems to be fixed by an equilibrium of forces, such as a tendency to crystal-formation, surface-tension, and electrical attraction or repulsion, the analysis of which forms one of the most fascinating problems in physics and chemistry.

The importance of some knowledge of the processes by which the colloidal state is brought about and maintained in the animal body need not be insisted upon. The reader will find a mass of information in the book, and our only regret is that Dr. Burton has not illustrated in greater detail some of the processes which he describes as dependent mainly on the characteristic properties of colloids. The book is one with such broad bearings that it will appeal to a wide circle of readers.

DELEGATED LEGISLATION.

Three Lectures. By CECIL T. CARR, LL.D., of the Inner Temple, Barrister-at-Law. Cambridge: The University Press. 1921. Pp. 78. 7*s.* 6*d.*

OF the learned professions that of medicine is probably the most directly concerned with the advantages, disadvantages, and complications inherent in delegated legislation. When an Act of Parliament is passed in the interest of the public health—for example, the Insurance Act, 1911—the large body of practitioners whom it concerns will know little of their new duties or responsibilities unless they study as they are issued the regulations ordered by the Act to be made by the appropriate authority. To quote Dr. Carr: "When the King in Parliament, our supreme law-making authority, expressly allows some other authority to undertake this kind of supplementary law-making the result is what we call 'delegated legislation.'" Such legislation may be and is often anathematised as a great nuisance by many medical men and by a public whose members—farmers, for instance—grumble at having to obey laws, for such they are, which are so readily multiplied, amended, or revoked.

Dr. Carr, however, makes out a good case for the delegation, subject to safeguards, which he enumerates, and to principles, which should be considered by all legislators. Equally they should be appreciated by all who desire to attack departmental or municipal regulations whereof they disapprove. Medical men will admit the desirability of a power in the hands of the Government to deal promptly with emergencies arising out of disease. The Act, passed in 1832 for dealing with an epidemic of cholera, is cited by Dr. Carr as the first Act of importance which recognised the possibility of local and unforeseen demands arising for sanitary measures; it showed also the necessity for delegating powers of legislation to a body capable of acting effectively. The obvious impossibility of Parliament discussing all the aspects of the cases for which it now provides by the delegation of its powers is considered by Dr. Carr in a chapter "The Case for Delegation." His readers will find Dr. Carr lucid as well as learned, interesting as well as informative, and eminently readable. As to delegated legislation and the burden of a multiplication of binding enactments that control our liberties, we must endure them as conditions of modern civilisation, not unconnected with the development of medical and other sciences.

NOTES ON DENTAL SURGERY AND PATHOLOGY.

Second edition. By T. W. WIDDOWSON. London: John Bale, Sons, and Danielsson. 1921. With 131 illustrations. Pp. 274. 21*s.*

THIS type of book can only be used for refreshing the memory when the subjects dealt with have been thoroughly mastered by the study of more extensive and authoritative works; in this volume the section dealing with treatment is more adequate than that on pathology. The information with regard to the latter is often far too meagre, and is of doubtful value. For example, hyperplasia of the pulp is described as "an increase of the elements which compose the tissues of the pulp resulting in an increase in its bulk." Suppuration as "a degeneration of the pulp tissue into pus through slow progressive ulceration."

The book is hardly well balanced. Nine pages are devoted to erosion, including eleven theories of its causation, most of which have long ago been discarded. Oral sepsis, on the other hand, is not mentioned, though there is indeed a chapter of one page on "Affections which may arise from Dental Neglect." These affections are tabulated: 13 eye lesions are given; osteo-arthritis is mentioned, but not rheumatoid arthritis: and in the list of affections belonging to the gastro-intestinal tract, symptoms and pathological lesions seem to be confused.

If the notes had been written in such a manner as to direct the student in the way in which he should acquire knowledge from reading and clinical observation they would have been more valuable.

JOURNALS.

THE BRITISH JOURNAL OF EXPERIMENTAL PATHOLOGY for December last contains the following papers: The Relationship of Blood-Groups to Disease, by J. A. Buchanan and E. T. Higley. These authors find no relationship between blood-groups and malignancy (as suggested by W. Alexander), nor between blood-groups and any disease investigated. The percentages presented by Moss are capable of considerable variation, without special significance. Nationality should be taken into consideration in statistical studies of blood-grouping.—Dysentery Immunisation in Rabbits by the Oral and Subcutaneous Methods, by S. Kanai. A small degree of immunity has been produced in rabbits by the oral administration of *B. dysenteriæ* (Shiga), large quantities thus given being apparently without effect on the general condition of the animal, but the immunity so obtained is far inferior to that produced by the subcutaneous inoculation of a carbolised vaccine administered in three doses of 50 and 100 (twice) millions.—The Comparative Influence of Pure and Commercial Sugars and of Combined and Separate Sterilisation on Bacterial Metabolism, by C. G. L. Wolf.—Septicæmia: The Selective Deposition of the Colon-Typhoid Group of Bacteria in Fixation Abscesses, by T. H. C. Benians.—A Study of Hæmoglobinophilic Bacteria by Agglutination and Agglutinin Absorption, by H. B. Maitland and Gordon C. Cameron. An investigation of 38 strains of *B. in-*

fluenzæ from hospital patients during non-epidemic periods gave the following results: (1) Nearly all strains possess a serological individuality. (2) Identical strains do occur, but are not frequent. (3) The antigenic value of strains varies. The serum obtained from certain strains agglutinated little more than the homologous organism. (4) The morphological variations are marked, but do not correspond to variations in agglutination. (5) Two or more serological races may be present in the same patient.—The Relation between Bile Salts and Hæmolysis in the Blood-Stream, by E. Ponder. Bile salts do not cause hæmolysis when in the blood-stream, nor does hæmoglobinuria follow their injection. Since the reaction of the blood is not acid, the inhibitory action of the serum cannot be due to their forming an adsorption product with the albumins of the serum, and remains unexplained. The fact that bile salts are found in only slight traces in the urine is accounted for by their colloidal nature, which causes them to be excreted by the kidney with difficulty.

BRITISH JOURNAL OF OPHTHALMOLOGY. December, 1921.—J. H. Parsons: The Fourth Cranial Nerve. The decussation of the fourth nerve is a unique phenomenon in anatomy, for although most motor nuclei are connected with the opposite side of the central nervous system by decussating fibres, in the case of the fourth nerve the decussation takes place after the nerve fibres have left the brain. The subject is discussed from the point of view of comparative anatomy and also from that of embryology. Phylogenetically the fourth is a very primitive nerve. It exists right down to the very beginning of the vertebrates. It has been suggested that originally it was connected with the pineal eye, either in a motor or a sensory capacity. There seems to be no very satisfactory explanation of the dorsal decussation.—G. L. Colombo (Parma): Bilateral Changes in the Corneæ following Exposure to Cold in an Airman. Prof. Colombo relates the case of an airman officer, 23 years of age, who started for an aerial expedition from a mountainous zone in April, 1917. At a height of 4500 metres he had lost his glasses. He felt the cold in his eyes and the sight got so misty that he had considerable difficulty in landing. Twenty minutes after his descent he was examined. Both corneæ showed a superficial diffuse opacity, and in one eye there was loosening of the corneal epithelium. Three days later both corneæ were normal and full visual acuity was regained. The author considers that the intense cold (about −25° C.) produced insensibility of the corneal surface and a diminished lacrymal secretion, and that the lesions were caused by dryness and possibly by actual freezing of the watery constituent of the corneæ.—S. Holth (Christiania): New Technic in Punch Forceps Sclerectomy for Chronic Glaucoma. A technical paper epitomising tangential and extralimbal iridencleisis operations from 1915 to 1919.

IN the R.A.M.C. JOURNAL for December Commander W. S. Bainbridge, Medical Corps, U.S. Navy, discusses delayed healing of fractures due to general constitutional conditions in spite of satisfactory local treatment.—Dr. H. M. Woodcock's Study of Hæmatophagy has already received notice (THE LANCET, Dec. 31st, p. 1385).—Sir Robert Firth's calendar of birds and blossoms in an English countryside throughout the year makes delightful reading.—Major N. V. Lothian continues his account of the rooted objection of soldiers themselves to carry more than about 50 pounds weight. He tells how and why the (60th) King's Royal Rifle Corps was formed as the Royal Americans, in brown jackets with short rifles, when other troops wore scarlet, and carried the cumbersome smooth-bore.—Major F. W. W. Dawson recommends an abacus to all who do blood counts. Once the idea is suggested its value leaps to the eyes. Polymorphs, first row units, second tens, third hundreds; fifth and sixth rows, eosinophiles; seventh and eighth, lymphocytes; ninth and tenth, large mononuclears

Reports and Analytical Records.

AGOTAN.

(HOWARD AND SONS, LTD., ILFORD, LONDON.)

THIS drug, which was formerly sold under the German registered name of "atophan," has the chemical constitution 2-phenyl-quinoline-4-carboxylic acid and is also known as phenylcinchoninic acid. Agotan's claim to usefulness is that it increases the excretion of uric acid and urates in the urine, and should therefore find a place in the treatment of complaints such as gout or arthritis, in which there is an accumulation of uric acid in the system. Agotan is stated not to alter metabolism and it is non-poisonous. It is insoluble in water, soluble in alkali, alcohol, and acetic acid. The sample submitted melts at 210° C., which agrees with the text-book figure for phenylcinchoninic acid. We welcome efforts such as this to keep the manufacture of important synthetic drugs in this country.

ROBOLEINE.

(OPPENHEIMER, SON, AND CO., LTD., 179, QUEEN VICTORIA-STREET, E.C.)

This preparation, which is described as a reconstructive tonic food, was found to have the composition:—

Total solids	76·5 per cent.
Water	23·5 ,,
Protein (N × 6·25)	3·6 ,,
Fat	3·0 ,,
Specific rotatory power on solids ..	+ 118·2
Free acidity	nil.
Active diastase	present.

These figures show that roboleine is an extract consisting of malted materials, concentrated at such a temperature that the enzymic activity is not destroyed, and blended with fat, cholesterol, and neutral citrates. It is stated that roboleine is made from bone-marrow, beef jelly, malt extract, lecithin (egg yolk), and neutralised lemon-juice, together with the accessory food factors A, B, and C. Whilst only physiological experiment can confirm the latter statement, chemical analysis confirms the former. The makers have, we think, over-stated a good case in claiming that roboleine, containing as it does so little fat, is an effective substitute for cod-liver oil. The food is well prepared, not disagreeable to the palate, and should be of use in many directions.

ANTUITRIN (P., D. & CO.)

(PARKE, DAVIS, AND CO., 50–54, BEAK-STREET, W.)

Antuitrin is a solution of the active principles of the anterior lobe of the pituitary body, specially prepared for hypodermic administration. Anterior pituitary hormone has been employed in certain disturbances of metabolism, delayed development (both mental and physical), and derangements of the genito-urinary system, and a decided therapeutic influence claimed. The ampoule received contained a clear watery solution, which showed no coagulable protein and no Fehling-reducing substance. No organisms were found in stained films, and cultures on ordinary media remained sterile. The contents of one ampoule inoculated into a guinea-pig produced no signs of toxicity. The dose is 0·5–1·0 c.cm. injected hypodermically.

(1) "WELLCOME" BRAND LANOLINE; (2) "WELLCOME" BRAND LANOLINE ANHYDROUS.

(BURROUGHS WELLCOME AND CO., SNOW HILL BUILDINGS, E.C.)

The samples submitted conform to the requirements of the British Pharmacopœia, both with regard to physical characters and chemical tests. Crude wool-fat is by no means easy to purify and anhydrous lanoline should be light in colour and

practically inodorous. "Wellcome" anhydrous lanoline is of a light and bright colour, the odour of the original raw material has been entirely removed, and the purity ensures a high degree of stability. The "Wellcome" hydrous product, prepared from the anhydrous, is a homogeneous, non-separating stable preparation. Both brands are issued in tins containing 1 lb. and 7 lb.

DIGIFOLINE AND COAGULEN "CIBA."

(THE CLAYTON ANILINE COMPANY, LTD., 68½, UPPER THAMES-STREET, LONDON, E.C.)

The samples of digifoline submitted consist of (1) a compressed tablet preparation and (2) a solution put up in vaccine ampoules and in 2-oz. stoppered drop-bottles. These products are stated to contain all the glucosides of the digitalis leaf without the irritant saponins present in ordinary tinctures and infusions of digitalis. The manufacturers consider that these preparations are less toxic than digitalin and therefore permit a greater elasticity of dosage. 1 c.cm. of digifoline represents 1·5 gr. of standardised digitalis leaves and is equivalent to ¼ mg. (0·000259) of Nativelle's digitalin.

The samples of coagulen also consist of (1) compressed tablets and (2) vaccine ampoules containing a 3 per cent. solution. Coagulen is a cytozyme obtained from blood platelets by fractional centrifuging, desiccation, and dilution with lactose. It is designed for use in cases of both internal and external hæmorrhage, either by oral administration or subcutaneous intramuscular or intravenous inoculation. The hæmostatic properties were established in the surgical clinic at Berne before the preparation was placed on the market.

Both these products emanate from the well-known Society of Chemical Industry in Basle, Switzerland.

INOCULATION TESTS FOR PROTEIN THERAPY.

(DUNCAN, FLOCKHART AND CO., LONDON AND EDINBURGH.)

In our issue of Dec. 3rd, 1921 (p. 1174), we dealt with the rationale and method of performing protein sensitisation tests for asthma. Messrs. Duncan, Flockhart and Co. have put up these protein test substances in short capillary tubes, similar to those in common use for calf lymph vaccination. Thirty-two proteins are issued—meat, cereals, fish, fruit, green vegetables, roots, and a number of miscellaneous substances—all in liquid form, whereas the original substances used by Chandler Walker were in powder form, except the hair and feather preparations. This may be a disadvantage, since the dried preparations keep better than liquid ones. It is not stated how the preparations are made, nor what solvent is used. The omission from the list of feathers, down, and hairs is unfortunate, since in this country hens' feathers and cats' hair seem to be not uncommon sensitisers. Vaccines to correspond with the tests are supplied, and proteins of an uncommon nature can be prepared to special order.

PHYLLOSAN.

(CHLOROPHYL AND CHEMICAL CORPORATION, LTD., 26, COVENTRY-STREET, LONDON, W.)

This preparation, in tablet form, is stated to be an extracted chlorophyll (we spell it with two l's in this country), obtained from green vegetables, especially spinach, by the method of Prof. Emil Buergi, Director of Studies at the Pharmacological Institute of Berne University. The preparation is designed for administration in chlorosis, primary and secondary anæmias, and its use is advocated by reason of the close chemical relationship which exists between chlorophyll and human blood pigments. It is claimed that by this means larger amounts of the active principles of green vegetables can be administered to the patient than is possible by the ordinary use of a vegetable diet, that these active principles are freed from inert cellulose, and that large quantities of intestinal waste products are thereby avoided. The method of manufacture is not stated, but it would be interesting to know what relation, if any, this preparation has with the A-vitamin which is present in considerable quantities in green vegetables.

MOOGROL.

(BURROUGHS WELLCOME AND CO., LONDON.)

Moogrol is a mixture of esters of acids of the chaulmoogric series, designed for intramuscular injection in doses commencing at 1 c.cm. and increasing by 1 c.cm. every second or third injection up to 6 c.cm., the inoculations being given weekly. The price of this preparation has recently been reduced.

IODINOSOL AND SALICYLOSOL.

(E. T. PEARSON AND CO., LTD., LONDON-ROAD, MITCHAM, SURREY.)

Iodinosol is stated to be a solution of iodine "in a base of a partly oxygenated mineral oil consisting mainly of hydrocarbons"—doubtless another way of expressing the B.P. codex term "parogenum," which consists of liquid paraffin, oleic acid, and ammoniacal alcohol. On analysis, we found iodinosol to contain 9·8 per cent. of iodine, an amount which agrees closely with the 10 per cent. said to be present. It is claimed that in using iodinosol, which does not cause irritation or stain the skin, it is possible to obtain the full therapeutic effect of the administration of potassium iodide internally without the unpleasant disturbing effects so often associated with the continued administration of this drug. On this assumption, iodinosol would be useful in cases requiring protracted iodine treatment, such as rheumatoid arthritis or synovitis.

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Moisture	6·0 per cent.
Oil	2·1 ,,
Proteins	11·8 ,,
Mineral matter (ash)	4·3* ,,
Fibre	2·2 ,,
Carbohydrates	73·6 ,,

* Containing phosphoric acid (P_2O_5) 0·7 per cent.

Of the carbohydrates, 8·5 per cent., calculated as glucose, are soluble. Emulsified oil is easier and more agreeable to consume than neat olive oil. The emulsion when prepared is a highly nutritious food, rich in soluble carbohydrates, fat, and protein.

A COURSE of free lectures on Tuberculosis and Public Health will be given in the lecture hall of the Royal Institute of Public Health on Wednesdays, Jan. 11th to March 22nd, at 4 P.M. The first lecture will be on the Organisation and Administration of a Tuberculosis Service, by Dr. H. Hyslop Thomson. Particulars of further lectures will be found in our Medical Diary.

FRENCH SUPPLEMENT TO THE LANCET

Under the Editorial Direction of

Professor CHARLES ACHARD, AND Dr. CHARLES FLANDIN, D.S.O.,
PROFESSOR OF CLINICAL MEDICINE IN THE UNIVERSITY OF PARIS. CHEF DE CLINIQUE À LA FACULTÉ DE PARIS.

THE RÔLE OF HEREDITY IN THYROID PATHOLOGY.

BY DR. PIERRE VALLERY-RADOT,
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THE pathology of the endocrine glands is one of the most recent conquests of medicine. This branch of knowledge, which 50 years ago was practically unexplored, originated with the discoveries of Claude Bernard and Brown-Séquard. The thyroid body and the suprarenal capsules were the objects of the earliest research of clinicians and investigators; but despite the interest aroused by new ideas the field of research was confined, for the first syndromes recognised were strictly separated in compartments. Addison's disease, myxœdema, and exophthalmic goitre had long been known, but no connexion was perceived between these three distinct affections. No association of disturbances of the thyroid and those of the capsules was considered possible; hence myxœdema and exophthalmic goitre were needs attributed to failure or excess of thyroid secretion. But dangerously simple theories could not long prevail over new interpretations born of increasingly exact observation of facts and of more perfect knowledge of physiology. Numerous animal experiments, and knowledge gained at autopsies, enabled research workers to establish the fact that lesions of a single gland were rare—that usually several internally secreting glands were attacked, either simultaneously or successively. It might have excited remark that in an organism whose several organs function in harmony, only the endocrine glands could be isolated one from another; and from that idea arose the more recent and truer conception of multi-glandular syndromes to which French workers, Claude and Gougerot particularly, made important contributions. Only thus were to be explained many contradictory symptoms, description of which must be sought in vain in classical works. By this theory, whose value lies in its being based on carefully observed facts, it was possible to ascertain that a gland cannot function separately, but that there exists between one gland and the others a connexion of action and reaction, implying a complexity which sets in a new light the symptoms observed clinically.

The Concept of Dysthyroidism.

Thus one learns that when a lesion is produced by any one gland, the glandular limits are often overstepped; it is known, for example, that Addison's disease and Basedow's disease may be observed in the same patient. Similarly, the distinction between myxœdema and exophthalmic goitre is not so clear as has often been thought; the two diseases are bound up not strictly with a failure or excess of thyroid secretion, but rather with imperfect function. Thus because of the numerous intermediate forms assumed by thyroid affections, we prefer to use the general term "dysthyroidism." Observation has shown that even in cases apparently clear, where Basedow's disease or myxœdema is concerned, there is often an association of symptoms indicating at one and the same time an excess and a failure of thyroid secretion.

Garnier showed that thyroid lesions were very frequent in the course of acute infections, but that histological control was necessary to disclose them. Hutinel and Tixier observed the frequency of infectious diseases in youth (measles, scarlet fever, whooping-cough, rheumatism, chorea, mumps) to be in striking contrast with the rarity of exophthalmic goitre. Syphilis is at present one of the most evident causes of thyroid affections; Hutinel—and later Schulmann and R. Barthélemy, one in his study of syphilitic exophthalmic goitre, the other in his work on the endocrines and hereditary syphilis—have insisted upon this fact; but the same objection may be raised—i.e., the discrepancy between the extraordinary frequency of syphilis and the relative rarity of exophthalmic goitre and myxœdema. It must be recognised that whilst in many cases the rôle of syphilis is established, in many other cases it appears very doubtful—for example, where syphilis remains unrecognised or where it is only indicated in descendants by the appearance of dystrophic trouble. Thyroid affections are sometimes anterior to the appearance of syphilis, which only serves to aggravate them; frequently, moreover, syphilis and infectious disease have merely assisted the development of previously latent thyroid disorder. Similarly, thyroid affections are observed in women at certain periods of their reproductive existence—puberty, menstruation, pregnancy, confinement, lactation, and menopause—in the same way as keen emotion or traumatism may develop such disorders, otherwise latent. The apparently rapid onset of exophthalmic goitre is frequently only the lighting up of a condition previously unsuspected.

Glandular Heredity.

In the writer's opinion heredity ranks prominent amongst the obscure causes of thyroid affections. Its rôle has been the subject of much debate; nervous heredity was thought to be indicated, but to-day we know that glandular heredity is to blame. If the nervous predisposition exists, it is much more frequently the effect than the cause of thyroid disorder. The sympathetic nervous system certainly comes into consideration, but its rôle is apparently secondary; nervous disorder is only manifested as a sequel of thyroid disorder. In no case of glandular trouble has an autopsy revealed a lesion of the sympathetic mechanism. Strong emotion, however, which by itself seems incapable of producing Basedow's disease, may "revive or aggravate certain more or less latent manifestations of Basedow's disease such as tremor and tachycardia" (Souques). The facts concerning thyroid heredity are still imperfectly known; but it is recognised that a mother suffering from Basedow's disease may bear children who later—after strong emotion, traumatism, or some illness—will present some of the signs of that disease. This fact proves hereditary transmission of thyroid weakness, whatever the cause of the latter. Thyroid defect exists in the family, preparing a soil in which syphilis, infectious disease, traumatism, and emotion will act with particular efficacy. I consider that if syphilis has a *selective* action on the thyroid it is frequently on account of an hereditary predisposition, of which the origin is not always demonstrably syphilitic. This thyroid weakness is not always isolated, being frequently associated with general glandular weakness; it is not as easily shown in the thyroid as in the liver or kidney—no one contests the existence of hereditary hepatic or renal debility—but there is no reason to doubt its existence. Yet heredity cannot account for everything, and its rôle must not be exaggerated. In my thesis devoted to this subject I have reported the frequent but not invariable discovery of a connexion with heredity in 150 observations, collected from French and other literature and noted in patients under Dr. Apert at the Hôpital des Enfants Malades.

The familial and hereditary theory of thyroid disorder has existed for 60 years, principally amongst French writers on the subject. Trousseau was one of the first to mention it in his clinical work. Landouzy

and Déjerine contributed several conclusive pieces of work—the latter's being a remarkable thesis on nervous heredity and the connexion of Basedow's disease with nervous affections. Charcot derived nervous heredity from the fact of hereditary degeneration. Later, Dieulafoy, and still more recently Apert, L. Lévi, and H. de Rothschild, made special studies of thyroid heredity itself, and of hereditary degeneration. It is curious to observe that though the rôle of heredity has long been recognised in exophthalmic goitre, the hypothyroid conditions were completely ignored. Myxœdema was known, but its familial character was entirely unsuspected. Two workers, Brissaud and Hertoghe (one French, the other Belgian) first described familial myxœdema in 1899; but the facts of familial and hereditary hypothyroidism and dysthyroidism—doubtless because of their apparent rarity, since they had not been investigated—remained little known and were even doubted altogether. In 1918 Hutinel aroused new interest in their importance and in that of the different methods of transmission of glandular debility. The present writer determined to show that besides the heredity of exophthalmic goitre and hypothyroid conditions there exist hereditary changes not only nervous but glandular—changes capable of involving most of the endocrine glands.

Heredity, "Similar" and "Dissimilar."

Thyroid heredity may be manifested in two ways—i.e., similar or dissimilar heredity. The term "similar" heredity is applied to instances in which are found, in direct or collateral descent, one or more subjects presenting indisputable signs of Basedow's disease. The latter may appear in several children of one female and may persist for several generations; it is often complete—i.e., the various subjects may present all the signs of the disease. Again, similar heredity is sometimes incomplete, in the sense that in the family of a subject of Basedow's disease modified conditions of the same disease—cases of hypothyroidism or nervousness—may be observed, which may be clearly connected with thyroid defect. The most useful observations on this subject which I have found are, in France, the works of Dieulafoy, Souques and J. Lermoyez, Harvier, and Schulmann; and abroad, those of Cantilena and Oesterreicher.

True myxœdema may appear in several children of the same family but apparently cannot be hereditarily transmitted, as women suffering from typical myxœdema are generally sterile; but modified myxœdema and thyroidism can be so transmitted. The following is a case of obvious familial myxœdema observed by the writer: M. R., aged 40; very nervous, pulse 108. The whole family examined Dec. 27th, 1920, also found to be very nervous—father and five children, all boys. The mother had had a four months' miscarriage. The eldest boy, aged 15, appeared to be 8; myxœdema had appeared about the age of 2 and he had had long treatment, but did not grow, was incapable of learning anything and suffered from migraine. One boy, aged 11, was normal, one aged 8 also normal, one aged 5 in hospital with myxœdema, and one aged 13 months in hospital for the same reason.

In other and more frequent cases the mother was observed to be obese, very sensitive to cold, and constipated, with scanty hair and eyebrows and infiltration of the face—all signs of hypothyroidism clearly established by Lévi; one child may have retarded growth or may remain infantile, whilst others present the dry skin, scanty hair, thick lips, slow movements, and diminished vitality of the myxœdematous. Many children are considered lazy or backward because they are feeble, apathetic, and have no aptitude for work; in reality they are often the subjects of disease which it is possible to cure, or at least to ameliorate, by means of thyroid treatment to which recourse should always be had, particularly if the maternal antecedents indicate the true condition.

Lévi, Hutinel, and Apert have published numerous observations of familial thyroidism and of dysendocrinism. Some curious features have been described by an Italian writer, Spolverini, who has seen infants born of healthy parentage becoming myxœdematous after having been nursed by women with goitre. Thus, milk can, in certain cases, be an agent of transmission of thyroid poison. The rôle of heredity may be difficult to affirm, for the defect may remain latent for a very long time, only being revealed in adolescence or in adult age; but in congenital myxœdema the hereditary influence is more evident. Simple goitre, attributed to polluted water, is often a thyroid disorder, which may be transmitted to an infant under the form of Basedow's disease and myxœdema. Schiasi observed a manifest case of hyperthyroidism in a patient who was the son of a woman suffering from goitre; as the result of a wound of the neck this man presented testicular trouble at the same time as turgescence of the thyroid. Thus, in brief, are the facts of similar heredity which it is here possible to mention.

Dissimilar heredity is at least as frequent, but seems at first more difficult to admit. It might excite surprise to find subjects of well-defined exophthalmic goitre giving birth to myxœdematous children. One child may develop Basedow's disease, and another child of the same family may develop myxœdema. More infrequently may be found in one child hyperthyroidism, in another hypothyroidism. Those reactions in opposite directions may be observed, not only in the same family, but in the same individual; this latter condition may be called individual dysthyroidism, as opposed to familial dysthyroidism. The writer has observed amongst several patients of this type presenting contradictory signs a girl of 15 with exophthalmos and pronounced goitre; the pulse was 150, and tremors were present, but there was no psychic trouble or excitement; the patient, on the contrary, was apathetic, fat, and devoid of all hair.

Again, a boy of 13 was observed, in whom typical myxœdema appeared when he was 6; he still presented distinct signs of myxœdema, but his eyes were bright and clear, he was well-grown, with perfectly normal intelligence. Sometimes these patients present modified signs of hypothyroidism (migraine, œdema, scantiness of hair and eyebrows, cold and cyanosed skin) but display—at intervals of hours, weeks, or months—attacks of diarrhœa, increase of temperature, great excitement, swelling of the neck, and tremor, which are distinctly ameliorated by corpus luteum and thyroid extract. These crises are exactly described by Lévi and Rothschild, under the name of "thyroid instability." The present writer has observed several well-defined cases where a mother with goitre and hyperthyroidism has borne a child presenting hypothyroidism; in other cases the child presented congenital myxœdema.

Involvement of Other Glands.

Dissimilar heredity does not always involve only the thyroid. Other glands may be affected at the same time and play a part in the hereditary factor. Thus, obesity is frequently noted in familial hypothyroidism. Pituitary changes are often observed together with thyroid affections, and may occasion important disorders in the individual and in the offspring. In several observations acromegalous parents have been noted as having myxœdematous children. Barthélemy has instanced the case of a syphilitic father, one of whose children was acromegalous, the other myxœdematous. The connexion between the thyroid and the ovaries is sufficiently well known, and the reciprocal action of these glands may affect the offspring. The liver—a gland, like the testicle and the ovary, both of internal and external secretion—is similarly connected. Biliary lithiasis is often associated with thyroid disorder in the individual or the offspring. Knowledge of the rôle of the thyroid in the metabolism of calcium and in the general development of the skeleton enables us to understand the connexion between the thyroid and bone affections. Bone disease is frequently observed in children of subjects showing dysthyroidism. Lastly, achondroplasia and mongolism have occurred in families with Basedow's disease and myxœdema; and certain skin conditions (ichthyosis, scleroderma) are also seen in families displaying hypothyroidism.

Present Position Concerning Thyroid Pathology.

These ideas concerning thyroid pathology are not simply theoretical; they are based on numerous clinical observations made by many writers. Doubtless diagnosis in aberrant cases is not always easy, and it must be recognised that so far the great stumbling-block of endocrinology has been the impossibility of bringing sufficient scientific exactitude to bear on diagnosis. True, attempts have been made to estimate by humoral reactions the vitiation of thyroid secretion. R. Porak observed that injections of pituitary extract which in normal subjects provoke acceleration of the pulse give rise to no such acceleration in myxœdematous subjects, whilst in patients with Basedow's disease they produce marked bradycardia. Claude and his pupils, using adrenalin, have also observed in their subjects acceleration of pulse in normal health, intense and lasting bradycardia in Basedow's disease, and no modification in myxœdema. The results of biological tests are interesting, but unfortunately the reactions vary too widely with the subject for absolute confidence to be placed in them. Attention must, then, be devoted to the clinical signs and to the effects of treatment, which permit a certain degree of suspicion as to the predominance of action of this gland or that; the thyroid, however, is known to be one of those glands which give the best results, being capable of influencing lesions not always strictly limited to itself. It is chiefly due to experimental observation (the work of many writers, of whom the principal in France are Lortat-Jacob, Richoud and Jeandelize, Claude and Rouillard) that the facts of thyroid heredity possess a scientific value. It has been shown that thyroid disorder of parents determines in their offspring certain conditions such as rarity of birth, poor development, malformations of bone, shortness of life, and lastly, myxœdema; the successful result of thyroid treatment has also been demonstrated.

Conclusion.

This knowledge of the rôle of heredity in lesions of the thyroid has, above all, a prophylactic interest. It permits at times of diagnosis of disorders in the parents which enables treatment of their children to be directed against the real cause of disease. However, the thyroid condition of the parents is no indication of the degree of thyroid weakness in the offspring; a modified form in the mother may give rise in the infant to a clearly characterised syndrome, and vice versa. It is, then, important to treat parents showing even the least signs of thyroid affections. In treating the nursing mother, one probably gives treatment also to the child, since products of thyroid secretion probably pass over in the milk. Wet-nurses should be examined from this point of view. Maternal lactation is not contra-indicated unless a recrudescence of symptoms of thyroid disorder is observed in the mother or unless signs of excitation appear in the infant. Treatment must be carried out with prudence and perseverance.

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THE TREATMENT OF WAR INJURIES OF THE SPINAL CORD.

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TRIFLING concussion of the spinal axis, such as that due to the wind of a bullet, or to the repercussion on the spine of the shock of a projectile passing more or less near to it, will be excluded from this study. Such concussion, whose clinical picture is now well known, generally runs a favourable course without need for surgery; but it is otherwise in the case of grave lesions of the spinal cord—that is to say, complete or incomplete section, serious contusion, compression, and certain violent disturbances which, in the great majority of cases, produce a clinical syndrome of total section. The treatment of these conditions constitutes one of the most perplexing problems of war surgery—subtle as regards its indications, restricted in technique, deceptive in its results—and therefore all the more urgently demanding improvement.

The series of complications determined by physiological section due to traumatism are often of an importance disproportionate with the gravity of the causal lesion. These complications constitute disorders demanding separate treatment; thus it is necessary to consider the treatment of (1) the medullary lesion, and (2) each of the complications. Unless this distinction is made, the therapeutics of serious medullary injuries is confused and incomplete.

1. *Treatment of Lesions of the Spinal Cord.*

The evolution of the majority of cases of these spinal injuries points to the inability of the spinal cord to recover after section or violent traumatism. At least, the slowness of the process of regeneration, histologically observed,[1] is such that no sign of it has appeared before the patient's death. This fact, held to be indisputable before the war, led the majority of surgeons to consider wounds of the spinal cord as hopeless; it is still generally believed that to intervene with any operation involving shock simply hastens the patient's death or at least leads to no beneficial result. But this inaction is contrary to the theory of immediate intervention after war injuries, and admits, moreover, of two important objections: (1) The leaving untouched of an intra- or a para-rachidian projectile; neglect to treat the seat of a vertebral injury is exposing the patient to the risk of various infectious processes which may complicate the situation. (2) Numerous observations have clearly shown that the clinical signs of spinal traumatism are in their initial phase frequently deceptive. It is known[2] that congestion and œdema of the meninges

[1] Roussy and Lhermitte: Annales de Médecine, 1915, No. 6.
[2] Sencert: Congrès de Chirurgie, 1909.

attend medullary lesions, and that intra-arachnoid hæmatomata modify profoundly the signs of spinal disorder.

Of late years anatomical and clinical study of a large number of cases has permitted neurologists[3]—Roussy and Lhermitte in particular—to show the frequency of commotional phenomena which complicate the signs of interruption and cause a diagnosis of total section to be made, after which, at the end of a few days, function returns, showing partial or total integrity of the spinal cord. It is, then, clear that the syndrome of spinal section does not correspond exactly to the anatomical lesion, being sometimes associated with contusion or compression. But the presence of a projectile, of a splinter or fragment, coming in contact with the dura mater or with the cord itself, is a powerful source of aggravation of the initial lesion, acting as an agent of compression; the presence of such a foreign body cannot but favour the development of sclerosis which will affect the healthy portions of the spinal cord, and under those conditions, liberation of the compressed cord becomes a matter of urgency. With the treatment of the nervous lesion in view, the value of rapid surgical intervention seems scarcely disputable: if many operators reject such action, and if many neurologists advise against it, it is only because they consider intervention at a later stage much less dangerous. It cannot be disputed that laminectomy, even when followed by operation on the spine, if performed after the initial phenomena of shock have subsided, is perfectly well tolerated. The present writer, in a series of 12 laminectomies delayed until a month or more had elapsed after infliction of the wound, has not lost a single case.

Unhappily, it is very evident that there is another factor always to be considered in the removal of a foreign body from an organism: the spine cannot derive benefit from decompression induced after such a delay. The intense fibrous reaction observed during operations and necropsies, in the neighbourhood of war injuries of the medulla, forbids the hope of regeneration of nervous elements subjected to long strain. No conclusive result was obtained in the 12 cases referred to above.

Exaggerated Danger of Early Intervention.

Is this reputed danger of early intervention justified? I do not think so. Laminectomy without opening of the dura mater has never appeared to me to be more serious than any operation of the same duration on a limb. Manipulation of the spine itself is doubtless more serious, but here again, I have never observed in this connexion those post-operative phenomena induced, for example, by extirpation of a medullary tumour—i.e., rapid rise of temperature to 40 or 41° C. following the operation, profound adynamia, collapse, and sudden death. According to Pachon, the blood pressure does not undergo the sudden reduction reported in intervention involving intra-abdominal or juxta-cardiac manipulation. The frequent failure of early intervention is apparently due to another cause.

Consideration of a Series of 27 Cases.

The following points were suggested to the writer by consideration of 27 medullary lesions followed in a day or two by the syndrome of total section. A proportion of cases of spinal injury die in from three to five days, whatever treatment is given. This proportion is considerable—35 per cent. according to Guillain and Barré. My own observations show an even higher figure—13 cases out of 27—i.e., nearly 50 per cent. My findings at necropsies, like those of all workers who have studied the question during the past four years, show that no complication capable of causing sudden death was found in many cases. Meningitis, although formerly held to be a frequent accompaniment, was exceptional among my cases, appearing only once in the 13. In all probability, some form of shock is responsible, which, hitherto unrecognised, has a pathogeny and signs resembling those of traumatic shock, but of which the evolution is slow in contrast with that of the traumatic form. These severe medullary paraplegias present from their onset an intense vaso-dilatation of the abdomen, in contrast with extreme anæmia of the upper part of the body, including the nervous system.

Hyperpyrexia (40–41° C.), which generally appears on the second day, can be ascribed to disorder of thermic regulation consequent upon the spinal lesion. Those patients are pale, with slow soft pulse; they are calm, and retain possession of their faculties, reacting to no treatment, and dying tranquilly. In every case, of course, this condition of slow progressive "shock" must be combated by all possible means. An inclined position—the head being low—seems indicated.

It appears, then, that rapid intervention in medullary traumatism is not particularly dangerous; the heavy mortality observable during the first few days appears alike in cases surgically treated or untreated; but the former benefit later by the fact of spinal decompression and by treatment of their wounds with a view to prevention of infection. In 14 cases which survived the fifth day—nine having undergone early decompressive laminectomy—five showed manifest improvement of the medullary lesion, and regression of anæsthesia and motor disorder—results directly traceable to surgical intervention. These, however, were cases of modified compression, or incomplete section, of the spinal cord. The other four had suffered complete section; one of them died on the thirty-fifth day (complication: sacral bedsores, sacral necrosis, meningitis); the other three were evacuated with good general condition, but with no functional improvement. Of the five others who had no surgical treatment, one died of a pulmonary complication on the twelfth day, and the others, although they were evacuated in a fair general condition, displayed no regression of medullary signs.

These results are clearly favourable to early surgical intervention. Considering the nature of the injury, it does not appear that crushing of the spinal cord by fracture of the spine (due to a fall or shock) is less grave than a wound from without. Bullets and shell fragments cause lesions similar in their evolution; the presence of an intra-rachidian foreign body does not appear to be a very serious factor, apart, of course, from the question of infection. All the cases here referred to were lesions of the dorsal or lumbar spine. Superior dorsal and inferior lumbar wounds differ little from the point of view of prognosis; shock is not more marked in one than in the other, and the complications are the same.

Cervical Lesions, &c.

Grave lesions of the cervical spine are rare; they scarcely ever passed the aid-posts. The syndromes of cases which came into one's hands were those of concussion running a rapid course; hence, war injuries of the cervical spine have, paradoxically enough, a better prognosis than others. But the anatomical lesions of the cervical injuries are different. Wounds of the cauda equina, again, present an entirely different aspect; they are radicular lesions, and the nerve-roots have a power of regeneration which contrasts strongly with that of the spinal column. Lesions of the cauda equina, with their marked regressive tendency, have a relatively favourable prognosis. Their evolutionary differences are too great to admit of their inclusion in a study of medullary traumatism.

Technique.

The technique of surgical intervention is well known; laminectomy presents no serious difficulty. Regional anæsthesia is useful in order to diminish the risk of pulmonary complications following narcosis. If general anæsthesia is necessary nitrogen protoxide is valuable, as in all cases of severe shock. The only critical point during intervention is the opening of the spinal canal, since lesions of the posterior arch of the vertebra, caused by the projectile, are not always suspected. The writer always employs the following method: after resection of the apophyses as far as their base a hole is rapidly trephined close to the

[3] Roussy and Lhermitte: Société de Neurologie, 1918, April 11th.

[4] Claude and Lhermitte: Étude sur la Commotion de la Moelle Cervicale, Revue de Médecine, 1917.

point of union of the two bases, by which they are rapidly extracted one after the other by the transversely introduced bone forceps. The superior or inferior laminæ are then dealt with as necessity dictates. Care must be taken with regard to the dura mater; the indications for its incision are rare when searching for a projectile which, in the great majority of cases, has entered by the posterior route. If possible the wound of entry must be found, and the projectile extracted through it, for protective adhesions, which develop with astonishing rapidity, isolate the subarachnoid cavities from the foreign body. Frequently, if extraction is correctly accomplished, not a drop of cerebro-spinal fluid escapes.

There is nothing to be done if the spine presents a zone of abrasion with partial section; the softened medullary tissue will not tolerate any attempt to draw together the parted surfaces. In a case of total section with loss of several centimetres at either end, suture may be attempted by introducing strong catgut stitches at a distance in order, if possible, to draw the two surfaces together. This manœuvre is laborious, but should be attempted; although, to the writer's knowledge, it has not yet given any result.

If the dura mater is widely opened suture must be attempted; in a case of loss of substance the writer has performed autoplasty with a piece of fascia lata. The spinal canal is drained with a large wisp of hair for 48 hours. Afterwards the skin and the erector spinæ muscles are sutured with metal wire.

2. *Treatment of Complications.*

It may be laid down as a principle that if the patient dies after the first five days a complication causes death. The complications are doubtless caused by the medullary lesion, but their evolution is separate, and they may occasion death in a patient showing signs of regression of the spinal lesion. It is thus of capital importance to guard against or treat them. Spinal meningitis need not be emphasised, for it is much more rare than has been supposed, and rational treatment of the wound will mitigate it. There are only three important complications to consider; they appear indifferently in wounds caused by projectiles and in internal traumatism, and are as follows: 1. Urinary infection. 2. Decubitus. 3. Pulmonary sequelæ.

1. *Urinary Infection.*—This complication must be considered as an inevitable result of repeated sounding during the first days. Its rapidity of appearance and degree of intensity doubtless depend on the aseptic care given to catheterisation. But, apart from the fact that this process is almost always entrusted to an assistant, the most exact precautions cannot protect the atonic and constantly distended bladder from a growing infection. This infection spreads rapidly throughout the urinary system, as is proved by systematic examination of the kidneys at autopsy and microscopically, even when the clinical signs have not been observed during life. The evacuation of the vesical contents by repeated catheterisation is therefore a practice which cannot be too severely condemned. It should be replaced by permanent and continuous drainage, either by a tied-in catheter or by suprapubic cystotomy.

The catheter is usually easier to employ, although there are spasms difficult to contend with, but its lumen is easily obstructed, and stagnation in the lower part of the bladder is inevitable. It must be frequently changed, whence arises traumatism of the urethra. The pliable sound flattens out and drains badly; the hard sound chafes the urethral mucosa. In short, this process does not suffice to prevent infection. Suprapubic cystotomy has no drawbacks, admitting of good drainage, rest for the urethra, and easy cleansing of the bladder. Its results are surprising[5] particularly in reduction of high temperatures; the latter sometimes fall as rapidly as after incision of an abscess. In all cases the urine becomes regular in quantity, clear and limpid, and the patient may be considered safe from all infection of the superior tracts. The operation is very simple, and may almost always be performed without anæsthesia, the medullary lesion being frequently above the second dorsal vertebra. One point of technique demands attention: a *very narrow* vesical incision must be made, so that the drainage-tube is tightly held in the bladder; only thus can a regular flow be secured with no leakage. A right-angled connexion secures the drainage-tube to a long flexible tube leading to a jar at the foot of the bed. Suprapubic drainage should be continued indefinitely in cases of total paraplegia. When, however, the progress of the medullary lesion permits the patient to get up, or when vesical function returns, it can be terminated. The writer has carried out this form of intervention in 24 cases of medullary traumatism, and the results obtained are so satisfactory that at present he uses no other method, whatever the apparent condition of the urinary tract.

2. *Bedsores* constitute a graver complication than is generally supposed—above all the sacral sore which rapidly leads to osteitis of the sacrum, infection of the sacral canals, suppuration of the spinal cord and meningitis, by extension in the dural cavity. The writer has seen cases in which the roots of the cauda equina were flooded by pus, with perforation of the meninges and escape of cerebro-spinal fluid. Pierre-Marie and Roussy[6] have shown that decubitus does not constitute a fatal complication of medullary traumatism. Bedsores are quite avoidable by means of regular examination of the points at which they are apt to develop. To prevent their occurrence it is necessary to avoid all maceration of the skin at those points which press upon the bed. Dampness is here the enemy—urine, or fæcal matter from the incontinent anus. From this point of view suprapubic cystotomy, by diversion of the urine, is very useful. For the rest daily lavage of the intestine rids the rectum of its contents and permits some regularisation of the stools. Rubbing with alcohol, thick dressings, and plenty of talc dusted over the parts protect the latter. The patient's position should be regularly changed. Rubber pads are to be avoided; the patient should lie on a good mattress, neither too hard nor too soft. The treatment of existing bedsores consists of division and early resection of the mortified tissues, with dry dressings. Heliotherapy and warm air hasten cicatrisation to a marked degree.

3. The writer has not encountered the frequent pulmonary complications reported by some writers (Roussy)—i.e., pulmonary congestions, which are easily avoided by allowing the patient to sit up at an early stage, and by frequent changes of position.

Conclusion.

In conclusion, urinary infection is the complication most to be feared with spinal traumatism. It appears to be frequently avoidable, on the condition that it is foreseen and guarded against before it has arisen. The same careful provision will prevent the occurrence of bedsores, and will also prevent pulmonary complications from attaining any degree of severity. Once the period of shock is past, a patient wounded in the spine should not die if properly treated. Even without adherence to this doubtless too sweeping statement, we have advanced far from the time when section of the spine was considered to necessitate a prognosis of speedy death.

A certain number of these cases have now lived for several years. We have information concerning some of those who were operated upon in May, 1915, April and June, 1916, and March, 1917, and who are at present in a satisfactory condition.

Unfortunately, although definite results have been obtained in cases of compression and partial section of the spine, the same cannot yet be said of cases of total section. Eminent neurologists consider that all hope of results should not be abandoned even after several years. Our knowledge of regeneration in nerve injuries enjoins patience. The duty of the surgeon and his assistants is to carry on; possibly results will appear when they are least expected.

[5] Drapier: Les Complications urinaires chez les Blessés de la Moelle, Thèse de Paris, 1919.

[6] Pierre-Marie and Roussy: Académie de Méd., March, 1915.

THE LANCET.

LONDON: SATURDAY, JANUARY 7, 1922.

1922.

Prof. ROSENAU reminds us in the preface to a new edition of his great treatise, preventive medicine has become a basic factor in sociology and many medical problems are complicated with economic and social difficulties. That truth is clear enough for 1922. It has been, Prof. ROSENAU says, the object of his volume to give the scientific basis upon which the prevention of disease and the maintenance of health must rest, and in this object he does not differ essentially from the author of any standard treatise on curative medicine. Planted well apart, the two have grown up side by side, and their branches have intermingled more and more till the outline of the foliage has the fashion of a single noble tree. The common task of curative and preventive medicine is the chief hope in the coming year. The practitioner if adequately trained should play a valuable part in the work of the communal services; there was never a time when some did not see this essential truth, first put into precise language in the Dawson Report, and emphasised this week in a letter to our columns by Lord DAWSON. Part of the work of preventive medicine must require special training and experience; the practitioner will always remain the first link in any chain of services to improve the conditions of home life and of industry. A noteworthy Scottish decision recorded on another page of this issue brings prophylactic treatment definitely within the Insurance Acts, in harmony with the view expressed in the Dawson Report that the health authority should be enabled to make specific payments for the preventive work of the practitioner in the home and at the primary health centre. We see an encouraging sign of the times in the six months' post-graduate course shortly to be inaugurated at the London Hospital to enable those who have already acquired a legal qualification to share in the work of school clinics in the area in which they settle down to practice. Opportunities for so doing have already slipped from the practitioner's hand for want of such training. Sir GEORGE NEWMAN opens this course on Feb. 1st and it is, we believe, but the beginning of a blending in the training for curative and preventive medicine, which have been allowed to diverge too widely in the near past.

Clinical Laboratory Service.

THE important International Conference on Standardisation of Sera, which we reported on Dec. 24th, was concerned largely with laboratory methods, and was attended chiefly by well-known heads of laboratories at home and abroad. There was wonderful unanimity at this Conference, and its results are likely to be far-reaching. But they will fail to fructify unless presented in a form convincing to the clinicians who are the link between laboratory and patient. Clinical medicine is ready enough to follow any clear lead from the pathologist, and the suggestions made at the Conference will, when carried out, eliminate much uncertitude. Three out of four sections of the Conference were concerned with curative sera, and only in regard to syphilis was diagnosis the chief point at issue. But in either sphere the mutual exchange of opinion which went on at the Conference, combined with the proposed mutual exchange of cultures and of samples of serum and toxin, should result in a standardisation as radical as any one could wish.

The subcommittee over which Prof. W. BULLOCH presided has inaugurated the most searching inquiry into the comparative value for clinical purposes of the various complement-fixation tests. The extent to which these tests are now made use of by the clinician is almost beyond belief. The Pasteur Institute in Paris carried out last year 26,500 Wassermann reactions, and there are in France numbers of pharmaceutical chemists who conduct for gain busy serological laboratories. What Dr. PAUL SALMON, writing in a recent issue of the *Revue d'Hygiène*, happily calls the "relative confidence" of French practitioners in serological tests might, he thinks, be improved by appointing a superior commission, not only to supervise existing laboratories, but to remedy the crying need of such assistance. There are in France departments and towns of more than 100,000 inhabitants which possess no serious organisation capable of responding to the demands of local practitioners. In these areas it would apparently be impossible in case of epidemic to identify a focus of diphtheria or of dysentery. Similar questions of supervision have recently come up for discussion in the American Medical Association, in whose *Journal* for Nov. 25th appeared a lively leading article bearing on the organisation and control of laboratories, seeing that on them the doctor is dependent for a great deal of information respecting his patients which he has not the time or technical skill to get for himself.

Recent advances in medicine have been almost all along a line which involves these laboratory investigations. The ideal plan would be to have laboratories attached to health centres or institutions controlled by the community, but these, like the laboratories adumbrated in the Insurance Act, have not materialised, and the need for a high quality of work in considerable quantity is urgent. At some medical schools, St. Bartholomew's among them, resident hospital officers who used to send specimens across to the school pathological staff for analysis continue to do so for a moderate fee after starting in practice. The arrangement is a natural one as between teacher and ex-pupil, but could perhaps hardly be expanded without clogging the machinery. In America the need is met mostly by privately-owned establishments conducted for profit, and, from what our contemporary says, it appears that there is some suspicion that the work in these is not always done by highly-trained and responsible medical men. Now, laboratory assistants may have the manual, but certainly lack the mental, dexterity to produce reliable results. In Germany the practice is otherwise, for a Ministerial circular, dated March 27th, 1920, insisted on a special authorisation for the performance of serological reactions, and limited such work to doctors of medicine. It is said that laboratories require control, and the *Journal* of the American Medical Association has no hesitation in saying that

control should be exercised only by the organised medical profession. If this means that any lay workers should be under strict medical control we agree, but if it is suggested that the profession should exercise over medical laboratory workers a form of control which they do not have over other doctors we venture to think that this proposal arises from a complete misapprehension of the desirable relations between the two parties. There has been, ever since the clinical laboratory came into being, an unfortunate tendency to look upon it as a subordinate service. The best will not be made of physicians working in laboratories until they take their place as colleagues, when they and the clinicians will mutually understand and appreciate each other. Any control which is to be exercised over the physician in the laboratory by other members of his profession cannot, in the long view, be different in kind from that general suasion whereby incompetent practitioners are consigned to relative obscurity. To treat the clinical laboratory expert in any sense differently from the gynæcologist, the stomatologist, the aurist, or any other specialist is an attitude which will be ultimately impossible and should not be encouraged.

Occupational Morbidity.

RECORDS of mortality, rather than of morbidity, are usually relied upon when investigating the effect of occupation upon health. Yet, since each person can only die once, he can only provide one record as regards the effect upon his health of occupation, and even this, should he have changed his main occupation before death, may not be correctly allocated. On the other hand, many people during their lives provide several records of sickness while they are still at work. An important paper read by Mr. E. A. RUSHER, F.I.A., on Dec. 20th before the Royal Statistical Society, reviewed the efforts made in the past to study occupational morbidity, and showed how such men as PRICE, FINLAISON, SUTTON, and WATSON experienced great difficulty in obtaining accurate data. From his historical retrospect Mr. RUSHER drew certain conclusions: (1) Age has the greatest influence upon the rate of sickness, and next to this occupation; (2) occupation has more influence than has either locality or density of population, but the influence of these latter cannot generally be statistically dissociated from that due to occupation; (3) there are no reliable statistics in this country of morbidity amongst female lives; (4) no statistics exist of the sickness experienced by the community at large corresponding to those for mortality published by the Registrar-General, nor is information available as to the nature of the diseases causing sickness. The conclusions are important and disquieting since they indicate that, although the influence of occupation is found paramount in causing sickness, nevertheless there is little useful knowledge concerning male lives and none concerning female lives. And yet this state of affairs has been recognised to exist for nearly a hundred years. Little wonder then that Mr. RUSHER puts in a plea for systematic inquiry into the data now rendered available from the operations of approved societies under the National Health Insurance Act, and in particular, for the records to be analysed according to the nature of the disease and the occupation followed. Without such analyses, the effect of occupational influence can only be guessed at, and guess-work is far too dangerous when the well-being of the worker and his productive capacity are at stake. Mr. RUSHER himself set out a practicable scheme, illustrated from his own work upon statistics referring to the iron and steel trade, the boot and shoe industry, and the laundry trade.

Those directly and financially interested, both employers and employed, may well be urged to understand the position, and to interest themselves in the utility of accurate investigations. The benefit would be theirs; they should be responsible for the work. This way progress lies, rather than in standing by and waiting for Government action. Industry which has recently resisted the call for nationalisation should recognise that the liberty so gained carries with it responsibilities, which, if not readily and willingly shouldered, must finally lead to the withdrawal of that liberty. Men like Mr. RUSHER and other workers for the Industrial Research Board are capable of carrying out the work. Such development can hardly be expected from public resources in the present state of national finance, nor is there certainty that such development would be directed into the most practical channels. The time is overdue for industries as a whole to organise research and action based on research into the human factor, the economic importance of which physically and psychologically is coming daily to be more and more recognised. The health of its people is the first care of every industry; this assured, other profits will follow.

Health of the Royal Air Force.

THE Report on the Health of the Royal Air Force for 1920 was not issued to the public until the end of 1921, but it was presented to the Secretary of the Air Council six months ago. A prefatory letter by Air-Commodore M. H. G. FELL, the Director of Medical Services, whose well-earned distinction is chronicled elsewhere in this issue, narrates how the medical administration of the Force was evolved and why certain statistics have been omitted from this, the first report. It was not, for example, found practicable to introduce the statistical system for the Royal Air Force outside the United Kingdom in any comprehensive form, so that the information available from Egypt, Palestine, Mesopotamia, and certain parts of Europe, was not of sufficient value to allow the figures to have real weight. There are also no tabulated statistics of sickness affecting flying as opposed to non-flying personnel, the unanswerable reason for the omission being that without figures of the actual hours flown by each individual the statistics would be uninforming or misleading.

The Report deals with the health of the Royal Air Force as a whole, the subject being treated separately under two headings, one dealing with the men at home, and the other with the men employed overseas. The total of men reported upon is just short of 26,000—namely, 21,454 in the United Kingdom and 4478 overseas—and it is clear, with a proportion of nearly five to one, that in all the figures for sickness the predominating factor will have relation to the strength in the United Kingdom. A comprehensive nosological table shows death-, invaliding-, and sick-rates under the geographical areas, giving also the average duration of illness, as well as the figures for general and local injuries. The incidence of venereal disease, the effect of glare, and the prevalence of scabies are treated in particularly interesting notes. The cases of injury during the year are made the subject of a special table, and in the 71 cases of flying accidents shown, 39 are in the United Kingdom with 14 deaths and 32 overseas with 15 deaths. There were 11 cases of invaliding due to flying accidents, but in 10 of these cases the accident had taken place prior to 1920. Fifty-six of the 71

cases occurred in the officer group, 33 at home and 23 overseas, resulting in 12 deaths in each group; but there was only one accident among cadets and that not of a serious nature, while 1 death occurred in N.C.O. observers. The case-incidence among officers and cadets was 21·0 per 1000 of strength and the death-rate 8·5. Of the 15 cases not among officers and cadets 9 occurred in the fitter trade group. Other accidents noted in the table include accidents at athletic sports, and those incurred in starting motors, and in the use of motor cycles, as well as various mishaps to officers and men while off duty. Taking all things into consideration the injuries which have occurred in the service during the one year for which trustworthy figures have been available have not been excessive, and the fact must be regarded as testifying to, among many other things, great discretion in recruiting. Nothing but this would have been likely to lead to such good results. The rigorous examination of pilots, and the standard physical tests devised to eliminate unsuitable candidates, have evidently gone a considerable way in assessing physical efficiency.

From a medical point of view no section of an interesting Report is more valuable than that which describes the Medical Board for Aviation candidates. To enter the force it is now necessary to pass a medical and surgical examination, to provide evidence of good personal history, and then to emerge successfully from a trial consisting of certain tests for physiological assessment. These tests take note of the cardiac and nervous systems, and deal also with vital capacity, a subject upon which the work of Wing Commander FLACK and the researches of Prof. GEORGES DREYER have thrown great light. An anthropometric index of physical fitness has been devised, and the fixing of the standards of vital capacity should be applicable to the different elements of the population as well as to candidates for aviation work. The causes of rejection, apart from visual, and ear, nose, and throat defects, are, generally speaking, conditions of the respiratory, circulatory, and nervous systems. The things which have been found to be absent in the successful pilot, and present in pilots who have broken down, are, for example, poor vital capacity, low diastolic in addition to high pulse pressure, poor response of pulse to gradual exercise, tachycardia, and presence of tremor, or other signs of deficient nervous control. The standards of the Board must not be deemed unduly high—they are not. Given a healthy young individual in good physical condition, with normal vision, who has a clean family sheet, with especial relation to the nervous system in general, and a good personal history in relation to disease, there is little doubt that he would fulfil the required standards. But it is cruelty to the man and dangerous to his comrades to admit him if he is an unstable subject. The Report is quite short, logical, and very readable. Not only medical men but the public should make themselves acquainted with its contents.

AUXILIARY R.A.M.C. FUNDS.—A committee meeting was held on Dec. 16th last. Nine grants were made to cases in the benevolent branch for the orphans of officers, amounting to £605 14*s.*, and 20 grants in the relief branch for widows and children of the rank and file, amounting to £705 0*s.* 1*d.* These funds are for the relief of widows and orphans of commissioned officers, non-commissioned officers, and men of the rank and file of the Royal Army Medical Corps, Special Reserve, Territorial Force and New Armies, and also for the relief of the children of those who have been so severely damaged in the late war that they need help for the education of children. Requests for relief should be addressed to the Hon. Secretary, at the Offices of the Funds, 11, Chandos-street, Cavendish-square, London, W. 1.

Annotations.

"Ne quid nimis."

NEW YEAR HONOURS.

MEDICAL men will rejoice to see in the list of New Year Honours the name of Prof. C. S. Sherrington, who little more than a year ago received the highest scientific distinction of election to the presidency of the Royal Society. He now becomes a Knight Grand Cross of the Order of the British Empire. A Companionship of the same Order has been conferred upon Dr. John Oldershaw, J.P., late Mayor of Wallasey, for public services rendered in Liverpool and district. Among the new knights are Dr. George Stewart Abram, senior physician to the Royal Berkshire Hospital, and prominent in the civic life of Reading; Dr. George Seaton Buchanan, C.B., senior medical officer in charge of the department of General Health and Epidemiology at the Ministry of Health and Government representative to the League of Nations Health Conference—the value of his public and administrative work is well known to medical men the world over; Professor William Herdman, F.R.S., professor of zoology in the University of Liverpool and President of the British Association; Mr. John Herbert Parsons, F.R.S., surgeon to the Royal London Ophthalmic Hospital, ophthalmic surgeon to University College Hospital, and consulting ophthalmic surgeon to the Forces; and Mr. John William Thomson Walker, senior urologist and lecturer on urology at King's College Hospital. In the Order of the Bath Group-Captain (Acting Air-Commodore) M. H. G. Fell, R.A.F. Medical Service, and Major-General Courtney Clarke Manifold, I.M.S., have been promoted to K.C.B., while Surgeon Rear-Admiral William Bett becomes a C.B. In the Order of the Indian Empire, Major-General John Blackman Smith, I.M.S., Deputy-General of Medical Services in the Eastern Command, Lieut.-Colonel F. H. Hutchinson, I.M.S., Public Health Commissioner with the Government of India, Lieut.-Colonel Robert Fraser Standage, Residency Surgeon in Mysore, Lieut.-Colonel J. Entrican, I.M.S., Inspector-General of Civil Hospitals, Burma, and Khan Bahadur Nasarvanji Hormasji Choksy, retired medical officer, Bombay Municipality, become Companions of the Order. A Companionship of the Order of St. Michael and St. George has been conferred upon Dr. Robert T. Paton in recognition of services as Director-General of Public Health and as President of the Board of Health, New South Wales. On the Rev. F. V. Thomas, M.B., C.M., of the Baptist Medical Mission, Palwal, and Mr. L. H. Beals, of the American Marathi Mission, the Kaisar-i-Hind Medal of the First Class has been awarded. New Year awards and promotions in the Royal Air Force will be found under the heading of Services. We offer hearty congratulations to all who have thus been honoured.

PROHIBITION OF THE MARRIAGE OF CONSUMPTIVES.

IN some minds the legislative instinct is strong; almost every difficulty suggests by a simple reflex mechanism some legislative remedy. Like many another reflex this process is protective and self-preservative, and it is probably best developed in the most orderly and law-abiding members of the community. But like every other reflex it may be exaggerated to an uncomfortable degree. In the course of an address given at a recent meeting of the Budapest Medical Society, Dr. Kuthy stated that the whole tendency of modern treatment of phthisis was to bolster up tuberculous individuals. So far as humane feeling was concerned there was little to be said, for sentiment would probably never be ousted from the scheme of practical politics; but he was not sure

whether from some standpoints we did not take a wrong view. Why should tuberculous patients be allowed to marry and bring into the world offspring with tendencies almost certain, sooner or later, to render them a burden to society? Would it not be more logical, as well as in reality kinder, to forbid such marriages? Legislation was, of course, a drastic remedy, but nevertheless was invoked in almost every relationship of the complex system of modern social life. Almost the only considerable argument that could be advanced against protection of the race by forbidding marriage to the phthisical subject, was the fact that brilliant mental qualities are often found in families affected in that way. But many other families produce men and women who are as vigorous of brain as they are athletic of body. It was clear that no breeder would be content to produce stock which, although intelligent and of high mettle, was easily exhausted by exertion and prone to disease of all kinds. It appears from this abstract of Dr. Kuthy's address that what he had in mind was not the risk of infection run by the offspring of tuberculous parents, but the risk of the diathesis or tendency to contract consumption which this offspring is supposed to exhibit. A reference to recent standard works on tuberculosis, such as those of Prof. Maurice Fishberg and Dr. Louis Cobbett, shows that the problem of the tuberculous diathesis is so inextricably tied up with that of infection that it is impossible to formulate any definite opinion as to the importance of the former. Sir James Kingston Fowler, in his recent work on pulmonary tuberculosis, considers this problem insoluble, and statistical research by Dr. Raymond Pearl[1] emphasises its complexity. But even if it could be conclusively proved that Irish stock, for example, shows a greater tuberculosis tendency than Jewish stock, and that the liability to contract tuberculosis is greater in the first-born than in the later-born, it is difficult to conceive of legislation which would successfully counteract these tendencies. It would need Gilbertian ingenuity to eliminate the first-born and yet maintain the continuity of the race, and to breed tubercle-resistant Jews at the expense of putatively tubercle-liable Irishmen would be unwise, even if such preferential treatment were feasible.

SUMMERTIME.

ONE of the good things which happened at the brief Parliamentary session just over was the Home Secretary's undertaking to reintroduce a Summertime Bill early next session with Government backing. Whether we agree or not that the additional hour of sunlight or daylight must tend to improve health from the well-known physiological effects of light upon the biological processes in both animals and plants, undoubtedly the Act allowed people of all ages an opportunity for an additional hour's out-of-door relaxation or pursuit, and abundant evidence was forthcoming that advantage was taken of the opportunity. The children had extra play; evening games and health-promoting walks became more possible. The cultivation of gardens and allotments also received a marked impetus. A number of employers noticed increased vitality in their workers, and in some cases an improvement in the standard of the work. A suggested disadvantage, the alleged lowness of vitality in the earlier hours of the day, as indicated by the lower temperature of the human body at these times, is negatived by the fact that a modification in the hours of work and rest leads to a corresponding modification in the hours of highest and lowest temperature. Provided the hours of rest are not curtailed there is no reason to believe that the alteration could have any harmful influence. Children notoriously obtain less sleep in the summer months than during the rest of the year, but this is rather a matter of custom and of parental supervision than due directly to summertime. In the poorer parts of a town, more than any other, will children be observed playing in the streets at a late hour. Dr. C. J. Thomas informed the Parliamentary Committee on Summertime, which sat in 1916, that reports concerning fatigue and sleepiness of infants in London schools had been more numerous in some previous years than in 1916, when the clock was first put forward. The advent of summertime was accompanied by warnings which doubtless resulted in closer attention being given to the matter than usual. The opinion of the large majority of education authorities, elicited by the Parliamentary Committee, was that the children benefited by the change of the clock both by reason of the extra time they were enabled to spend in the open air, and also because of the cool hour gained in the morning in the place of a trying hour in school in the heat of the afternoon. Many authorities reported that children had been brighter and fresher in the mornings in consequence. Recent experience has not altered the views of these authorities. Of 272 bodies who replied to the circular of the Board of Education sent out this year, the majority, 158, are in favour of the continuance of the Act, 29 express no definite opinion, and while 85 attribute some ill-effects to the operation of the Act, they mostly take the view that harm would be obviated if parents sent their children to bed at a reasonable hour. Any ill-effects reasonably attributed to the change in time occur at the beginning of the period; they affect the younger children, and occur in towns rather than in the country. They are absent or negligible in the more northerly parts of the British Isles where children are accustomed to going to bed in daylight. The Parliamentary Committee, after reviewing the evidence before them as a whole, came to the conclusion that the vast preponderance of opinion throughout Great Britain was enthusiastically in favour of summertime. This conclusion still holds at home and even more so abroad. France and Belgium are likely to come into line with us in making the adjustment statutory and permanent.

[1] THE LANCET, 1921, i., 504.

THE ESTIMATION OF HEPATIC FUNCTION.

MANY methods of investigation have been proposed for ascertaining the function, or rather the functions, of the liver, but none of them have proved either practical or accurate. The test of alimentary glycosuria presents numerous causes of error, for the utilisation of sugar is a complex phenomenon and depends on the capacity of the tissues to fix or transform it, and also upon the endocrine glands and the nervous system. In an investigation at St. Thomas's Hospital Medical Unit, the results of which were published in THE LANCET of Dec. 31st last, Dr. J. C. Spence and Dr. P. C. Brett have eliminated some of these sources of error, and have shown how the blood-sugar curve after ingestion of 50 g. of lævulose may be used as a measure of hepatic efficiency. Some of the same difficulties have been found to apply to estimation of the urinary nitrogen in comparison to the total nitrogen and to the presence in the urine of peptones, amino-acids, and creatine after the ingestion of glycocoll. Recently P. Widal and P. Abrami described a new method which is both easy and practical, and is based on the physiological fact that after a meal of albuminoids the liver in normal conditions exercises what is called its proteopeptic function. If this particular function is at fault there ensues a vasculo-sanguineous crisis, called by Widal "crisis hæmoclasica"; this is characterised by leucopenia, with inversion of the leucocytic formula (relative lymphocytosis), lowering of the blood pressure, alteration in the blood coagulability, and lowering of the refraction index of the serum. We may here call attention to some investigations on the subject by Dr. Dazzi, of the University of Parma.[1] He followed the technique enjoined by Widal, giving a meal of 200 c.cm. of milk, and making the necessary investigations in from 20 minutes to three hours after its administration. He found all

[1] Giornale di Clinica Medica, July 20th, 1921.

the reactions present in five cases consisting of a woman with atrophic cirrhosis of the liver and ascites, a woman with gastric carcinoma and metastasis in the liver, a case of alcoholic hepatitis, and two cases of lymphosarcoma with hepatic hypertrophy and marked urobilinuria. On the other hand, the test was negative in another 10 cases of lumbago, pharyngitis; five men suffering from ischialgia, two from sequelæ of encephalitis lethargica, and one with spondylolisthesis. In three cases of advanced pulmonary tuberculosis, two with enlarged liver gave a positive reaction; in the other, which had only urobilinuria, it was incomplete, the refraction index and leucocytic formula not being modified. In three cases of lobar pneumonia the test was positive in two, which had urobilin in the urine; in the other it was negative and urobilin was absent. In a case of typhoid after the sixtieth day, in a period of apyrexia, the test was distinctly positive, there being secretion of urobilin and moderate hepatic enlargement; after a few days the fever appeared again and lasted three weeks, and after this period the test was repeated and proved negative; the liver was still slightly enlarged, but the urobilin had disappeared. In a case of peliosis rheumatica, with abundant elimination of urobilin, the hæmoclasic crisis was manifest after 20 minutes, was of very short duration, and characterised by diminution of the white cells and platelets and lowering of blood pressure, but the refraction index and leucocytic formula were not changed. In a case of chronic ulcer of the stomach with hypertrophy of the liver, there was only lowering of blood pressure, while the other factors remained unchanged. In two cases of syphilis Dr. Dazzi was able to confirm the observation of Widal that the test became positive after injections of salvarsan. On the other hand, he obtained a negative result in cases of plumbism, acute parenchymatous nephritis, appendicitis, chronic malaria, and exudative pleurisy. Of all the factors which characterise the hæmoclasic crisis, leucopenia was marked in all the cases and hypotension corresponded, while variation in the leucocytic formula was not found in four instances, and lowering of the refraction index of the serum was absent in two cases. Scarcity of platelets was most marked and corresponded in the few cases observed with the leucopenia and hypotension.

Dr. Dazzi concludes that the test, from its simplicity of technique and its delicacy, is an invaluable method of ascertaining the condition of hepatic function. A positive reaction, however, does not imply that the liver is profoundly or permanently injured, but represents insufficiency of the proteopeptic function of the liver which may exist equally well in slight and transitory changes of the hepatic parenchyma as in those of a serious and destructive character.

WILHELM ERB.

POSSIBLY the days of the "master" and "disciples" in medicine are passing or have passed, and with wider dissemination of specialist teaching the world over the delights of a continental Wanderjahr will be less frequently sought; but no one who has sojourned in the ancient becastled town by the Neckar will forget Erb and Nissl, or admit that stay-at-homes can ever sense the fascination of contact with master minds of foreign schools, under foreign skies, in days when receptivity is at its maximum and when the chosen career is at its opening. For this reason, if for no other, the death last month of the veteran neurologist of Heidelberg, Wilhelm Erb, cannot be allowed to pass unnoticed, though a new generation of neurologists has arisen to whom he must be little more than a name. It is true that in Erb's birth palsy and in the Erb variety of myopathy we have a means of perpetuating his memory, but these serve but feebly to indicate the prominent part he played over many laborious years in the development of scientific neurology and in that movement which has led to its commanding position in medical studies to-day. The student now entering on his curriculum finds in nearly every hospital a neurological department, or at least one teacher of medicine who devotes himself largely to neurology; and he can have little or no idea of the epoch when the voice of the pioneer was as of one crying in the wilderness. It was in 1865, as assistant to Friedreich, that Erb began his career in neurology, and succeeding years saw him establishing, by exact clinical observation and equally important classification, the foundation of scientific neurology in Germany; myotonia, myasthenia, muscular dystrophy, intermittent claudication, the syphilitic ætiology of tabes dorsalis and of certain paraplegias, were all differentiated and elaborated and erected on sure foundations, and this before modern methods of investigation came into vogue. Erb was, after Duchenne of Boulogne, one of the first to employ electricity for purposes of diagnosis and treatment; his "Elektrotherapie" appeared in 1875, and his diagrams of the motor points have since then re-appeared in text-books time without number, until, indeed, one may suppose they are one of the few things which will never be better done. From a note in the *Münchener medizinische Wochenschrift* we learn that no fewer than 237 publications stand to the credit of Prof. Erb, that he had in the course of his life's work no less than 61 assistants, and that it was said of them, "Untersuchen können die Erbschen Schüler alle." From such data we may better understand what Erb's school meant to neurology, what stimulus to research, what inspiration and enthusiasm; we may compare it, indeed, in respect of scientific and clinical attainment, to that of Charcot at the Salpêtrière.

VISIT OF A SERBIAN MEDICAL DELEGATION.

DURING last month Dr. Geo. Joannovich, Professor of Pathological Anatomy, and Dr. Radenko Stankovich, Professor of Internal Medicine, of the Medical School of the University of Belgrade paid a short visit to London as guests of the Rockefeller Foundation. Prof. Joannovich and Prof. Stankovich had previously made an extensive tour in Canada and the United States, studying methods of medical education and of public health administration and training. In London they were received by Sir George Newman, Chief Medical Officer to the Ministry of Health, who explained to them the outline of public health administration in England. Dr. R. J. Reece took them over the system of infectious disease control. They visited the medical and surgical units, public health laboratory, and physiological department of University College. They also visited the Medical Research Council's laboratories, the Lister Institute, the Cancer Research laboratories, and the Bland-Sutton Institute of Pathology at the Middlesex Hospital. Visits were paid to the Royal Army Medical College, the Wellcome Bureau Museum of Tropical Diseases, and the Museum of the Royal Sanitary Institute. Colonel L. W. Harrison showed them the working of the V.D. clinic at St. Thomas's Hospital, and Dr. E. W. Goodall conducted them over the North-Western Fever Hospital and Ambulance Station.

APPENDICULAR LITHIASIS.

Dr. Horace Packard has recently reported[1] a case of appendicular lithiasis which he claims to be unique in the stony hardness of the concretion. A man, aged 51 years, had suffered from mild recurring attacks of abdominal pain, not necessitating absence from business. Dr. Packard was summoned for one which had lasted five days. The patient was in bed, but appeared to be a normal person. The pulse was 76 and the temperature 99·8° F. The pain began in the right groin. At the time of examination it was felt about the navel, and there was soreness all over the abdomen on moving about the bed and on palpation. There was a distinct focus of tenderness on deep pressure in the position of the appendix. On the diagnosis of something abnormal in or about the

[1] Boston Medical and Surgical Journal, Dec. 1st, 1921.

appendix laparotomy was performed. The cæcum was found surrounded by adhesions, and in the depths of the iliac fossa an enormous appendix densely adherent. On separating the adhesions and palpating the appendix a very hard substance was felt. Careful finger dissection finally delivered the appendix with a ragged hole in one side, through which protruded a large stone of irregular shape and as hard as porcelain. Strangely no pus was encountered. The hole was apparently due to pressure necrosis. The appendix was amputated and the abdomen closed with drainage. The stone had a fang-like portion, such as might have come from the jaw of a lion. Prof. Watters made an examination of the specimen. He reported that the appendix measured 7 by 1·5 cm., and showed almost complete obliteration of the lumen. At a point 2 cm. from the cæcum was an irregular area of apparent perforation. At the tip was a concretion measuring 1·5 by 0·6 cm. Accompanying the appendix was a large concretion weighing 8 g. and measuring 4 by 1 cm. On section both concretions were found to consist of inspissated fæcal matter and an enormous crystalline deposit of bile salts in irregular concentric arrangement. In an experience of 31 years Dr. Packard has not infrequently found small boluses of fæcal matter resembling a seed in the appendix. They were usually of semi-putty consistence, crushing easily under finger pressure. But he never found one of stony hardness, and in the literature of the last 20 years he has not been able to find any instance of appendicular lithiasis approaching in size and hardness the present one. Of course there is an extensive literature of hard foreign bodies in the appendix, such as shot, pins, glass, eggshells, bits of enamel, bristles, hairs, bits of wood, gall-stones, seeds, cherry-stones, and such like.

EXPERIMENTAL CHOLERA.

CHOLERA presents a number of anomalous features which are difficult to reconcile with the usual conception of the pathogenesis of the disease as enunciated by Koch; the chief amongst these being the great readiness with which the vibrios undergo destruction in the healthy stomach and the inconstant results of human experiments. The facility with which the normal stomach destroys the organisms suggests that it should constitute an effective barrier to their passage into the intestine and that consequently mouth infection—i.e., infection by the commonly accepted route—should only occur in persons with defective gastric secretion. This suggestion is not in the least borne out by actual experience. Further, experimental infection by the mouth in human subjects, although it has led on some occasions to true cholera, has often failed to produce the disease, whilst on other occasions it has led to a transitory diarrhœa, associated with the presence of vibrios yet not in the least resembling true cholera. It is an easy matter to explain away these anomalies by the use of such terms as "altered virulence," with regard to the organism, or "individual susceptibility," with regard to the subject; but this is shirking the issue, and we must always approve attempts to more definitely elucidate such phenomena and to resist refuge in rather meaningless phrases. Such an attempt is before us in a recent number of the *Annales* of the Pasteur Institute, in which Prof. G. Sanarelli[1] gives an interesting account of a series of researches upon the experimental cholera of newly-born rabbits. In these young animals it is possible, during the first 10 days of their life, to produce a cholera-like disease by the ingestion of cultures of Koch's vibrio. The disease is not entirely analogous to the human malady, being most intense in the cæcum and appendix; the small intestine, according to Prof. Sanarelli and in contradiction to Metchnikoff, being only secondarily involved and to a lesser degree. Studying the fate of the ingested vibrios, Sanarelli has found that while they persist for some time in the mouth, both in vivo and in vitro they rapidly disappear from the stomach. Furthermore, where injection of cultures is made directly into the stomach, by exposing it through an abdominal incision, the results are nil. In this connexion the interesting statement is made that the germicidal action of the gastric juices does not depend upon their acidity, since it persists after this has been neutralised, but upon some substance of a fatty nature which may be extracted by fat-solvents. In view of these results, and taking into consideration a long series of experiments on this malady upon which the author has been engaged for some time, he dismisses the possibility of infection of the intestine by the passage of organisms via the pylorus and duodenum, and develops the thesis that the infection is a blood-borne one, the organisms reaching the blood-stream by lymphatic absorption from the bucco-pharynx and being secondarily distributed to the lower intestine by way of the blood-stream. This is a very revolutionary doctrine when applied to cholera, but it is to be remembered that the genesis of the intestinal lesions of typhoid is still a disputed point; one school holding typhoid to be a septicæmic disease with localised lesions in the intestine, whilst the other believes these to be the essential feature of the disease and that from these foci, infected from the intestinal canal, a mere accidental overflow of organisms into the blood accounts for their presence therein. Sanarelli further supports his contention by successfully producing the disease in these small animals by the subcutaneous and intraperitoneal introduction of the vibrios.

The author appears to have proved that the vibrios *can* reach the intestine by routes other than the direct route from the stomach, but it still remains to be shown that this is the normal route of infection in the human subject. It is fully admitted by Sanarelli that the disease in these young animals is not to be considered as completely identical with human cholera: the results just cited are suggestive, but the proof of their applicability to the normal course of this disease in man can only be obtained by actual study of cases of human cholera from this point of view, and this proof is still lacking.

[1] De la Pathogénie du Choléra. Le "Choléra Intestinal" des jeunes animaux. Par G. Sanarelli. Annales de l'Institut Pasteur, vol. xxxv., No. 11, November, 1921.

A TUBERCULOSIS HANDBOOK.

THE National Association for the Prevention of Tuberculosis has performed a useful service in publishing the third edition of their Handbook of Tuberculosis Schemes.[1] In the foreword it is stated that the aim has been to produce a tuberculosis directory of the different administrative areas, in so far as mortality from tuberculosis and provision for the care and treatment of this disease are concerned. The scope of the two previous editions, produced during the war, was necessarily restricted, but now that the various schemes have been developed and effectively carried out, the handbook affords a more complete record. The information given is conveniently arranged for reference and permits of rapid comparison of different county and county borough schemes. As an illustration, we may quote the information given concerning Glamorganshire:—

Vital Statistics.

Area: 489,529 acres. Population (civil): 827,639.
Character: Industrial.
Industries: Coal-mining, iron works.
Deaths from all causes: 9895.
Death-rate from all causes (per 100,000 civilians): 1196.
Deaths from tuberculosis:
Pulmonary, 635 } 832.
Other forms, 197 }
Death-rate from tuberculosis (per 100,000 civilians):
Pulmonary, 76·7 } 100·5.
Other forms, 23·8 }

[1] Handbook of Tuberculosis Schemes for Great Britain and Ireland. Third edition. London: Adlard and Son and West Newman, Ltd. 1921. Pp. 275. 10s.

Tuberculosis Scheme.

The county is affiliated to the scheme of the King Edward VII. Welsh National Memorial Association.

Tuberculosis dispensaries: Neath, Aberavon, Bridgend, Maesteg, Pontypridd, Caerphilly, Ferndale, Porth, Ystrad, Barry Dock, Penarth, Pontardawe, Pontardulais, Hengoed, Mountain Ash (all once weekly); Aberdare (twice weekly).

Sanatorium: Pulmonary and other forms (see schedule).

Farm colony: See schedule.

Open-air school: None.

Hospital (advanced, acute cases): See schedule. Within the county: Glan Ely Hospital, 184 beds; Cymla Hospital, 16 beds; Ogmore Hospital, 16 beds.

Care committees: In course of formation.

Medical staff: Tuberculosis officers.

Frank Clifford, M.B., D.P.H., Swansea.
James C. Gilchrist, M.D., Cardiff.
R. Melville Hiley, M.R.C.S., Pontypridd.
Norman Tattersall, M.D., Neath.
Martin P. Thomas, M.R.C.S., Merthyr.
Edwin Folliott, M.R.C.S. (Assistant), Cardiff.

The schedule referred to in this table gives a summary of the personnel and arrangements of the King Edward VII. Welsh National Memorial Association.

The statistical information is up-to-date throughout, the figures having been supplied in advance from the recently appeared report of the Registrar-General; the handbook should be of much value for reference purposes to those concerned in the administration of tuberculosis schemes.

STERILISED LAYETTES.

THE skin in the earliest months of life is exceptionally vulnerable, being endowed with but low power of resistance to invading micro-organisms and exposed to unusual irritation, both chemical, from fæces and urine, and mechanical in such regions as the occiput and the heels. Prof. E. Weill,[1] of Lyon, claims to have demonstrated that the surest way of protecting infants from dangerous skin infections is to clothe them systematically in sterilised linen. This is especially necessary in the more or less infected environment of a hospital. In his earlier experience he found that sterilised wrappings prevented body infections, but there were some cases of local infection of the occipital scalp. The latter disappeared when sterilised bonnets were included in the infant wardrobe. Some control experiments were furnished by changes of personal or momentary disorders of the sterilising plank. Reappearance of infection was regularly observed on these occasions. The following figures demonstrate satisfactorily the success of the method as practised in the professor's creche.

A—Before use of sterilised clothes (1897–1902).
B—After adoption of sterilisation (1902–1909).

—	Total admissions.	Total skin infections.	Infected on admission.	Infected in hospital.	Deaths with cutaneous abscesses.
A ..	886	93	32—3·6%	61—6·7%	56—6·3%
B ..	1184	93	80—6·9%	13—1%	12—1%

The general mortality of the creche has also shown a diminution since the introduction of sterilised clothing, but this reduction is probably due in part to other factors.

YELLOW FEVER NOT ENDEMIC IN WEST AFRICA.

IT was formerly taught that yellow fever was endemic in West Africa, but the recent Commission of the Rockefeller Foundation which travelled through West Africa from Senegal to the Congo had great difficulty in finding there any account of recent epidemics, such as have occurred in the Southern United States and in South America. The Commission—of which General Gorgas was president till he died, when his place was taken by General Noble, who had worked with him at Panama—had the advantage of the coöperation of Dr. Juan Guiteras of Havana, whose life's work has been with yellow fever. At the present time yellow fever is found chiefly in South American ports where temperature is higher than in West Africa, where there are more mosquitoes, and where there are many white people. Negroes and their children have a marked immunity to yellow fever, and it is only where, amongst the blacks, there are many susceptible white people that a considerable epidemic can arise; and only in a place which is a great centre of trade, and visited by many strangers, can repeated epidemics occur. Like several other communicable diseases, yellow fever rather quickly infects those susceptible and is brought soon to an end by the raised resistance of the community, unless fresh non-immunes are continually coming into the area. The cleaning-up of the American endemic areas with the destruction of mosquitoes, and the disappearance of the sailing ships which carried infected stegomyia from port to port are the chief agencies which have led to the disease dying out in West Africa. Prof. W. H. Hofmann[1] (of Havana), whose account we are here summarising, is of opinion that the best proof that yellow fever is no longer endemic in West Africa is that no outbreaks occurred there during the war though so many susceptible white men were sent to the region. He mentions that Dr. Guiteras, with his large experience, does not support Noguchi in claiming *Leptospira icteroides* to be the cause of the fever. Noguchi has, however, recently claimed that the injection of killed cultures has definitely protected thousands of susceptible persons in Central and South America, while the immune horse-serum, if used before the fourth day, has a curative action.

HEART DISEASE AND PRODUCTIVE ABILITY.

IT is interesting at the New Year to take note of the steady development of the study of heart disease in directions which are of great importance to the community. Such developments were the inevitable and direct sequence of the conviction that a great bulk of heart disease is a result of infective processes. This conviction was in turn the direct outcome of the demonstration that acute rheumatism was an infective process, for not only did this fill a great gap in the chain of evidence upon infective heart disease, but its frequent occurrence in the young forced into prominence the problem of prevention. For the last 20 years our pages have been open liberally to articles upon heart disease, and in particular rheumatic heart disease. Yet the main issue had been lost sight of in minor details. Insistence upon bacteriological refinements with regard to streptococci, refusal to admit that acute rheumatism was a definite disease, and blind faith in the specific action of the salicylates seemed to form an insuperable barrier to progress. There is probably no physician in charge of children who does not consider acute rheumatism to be a very definite disease, and few medical men who do not see that the broad clinical and pathological features of the disease point irresistibly to an infective process. In America the essentials have been more quickly appreciated, and in New York the Association for the Prevention and Relief of Heart Disease has already done good work, socially and scientifically. The germ of this enterprise was planted at the Belle Vue Hospital in 1911, and now the movement has spread from New York far and wide in that country. The literature published by this Association—either in the form of pamphlets or as printed folders—shows us the nature of the work that is done. The authors deal with prevention, the questions of occupation, sanatoria, longevity, mortality, heart disease in school life, &c. These are all subjects which form stepping-stones in the study of heart disease as it affects mankind. In the *Journal of Industrial Hygiene* for December, 1921, there are two papers—one by Dr. Paul White, of Boston, on the Problem of Heart Disease and the Industrial Worker; the other on Cardiac Disease and its Relation to Industrial Efficiency, by Dr. Carey

[1] La Médecine, November, 1921.

[1] Archiv für Schiffs- u. Tropen Hygiene, XXV., 10, p. 291.

Coombs, of Bristol—which represent some of the most recent contributions to the subject. Dr. White's paper takes a broad view of the problem presented in his article and gives useful examples of the practical employment of exercise tests for the heart. His final paragraph gives an admirable summary in these words: "Finally, let me repeat that heart disease and valuable productive ability may coexist in the same individual. We must know the kind and degree of the heart damage. Knowing this, we should be able properly to place the worker by using our common sense, by tests for a rough estimate of the physical capacity of the individual, and finally by the actual test of the work itself." Dr. Coombs, in a clear and reasoned article, reviews the points already touched upon above and gives encouraging news of developments in the provinces. The work of the Liverpool Country Hospital for Children deserves particular mention, for it recoginses, as essential to progress, the combination of educational facilities offered by the prolonged supervision of children with cardiac disease.

One of the important points, but not to be over-emphasised, is the study of the value of standardised exercises for testing the cardiac power. Much has been done already in this direction with the view of gauging more accurately the ability of convalescent cases with damaged hearts to go forward in their physical exercises, so that their industrial position may be assessed later, but, as Dr. White writes, "there are no short cuts to determine the heart's power which are of universal value." In other words, we are not testing the efficiency of a machine, but of a vital organ in a human frame—a widely different problem. The more carefully we study the growing literature on the industrial aspect of heart disease the more do we feel compelled to ask ourselves, Are we doing our best for the cardiac children in London and throughout the country, and are we doing our best for the adults? Cannot a greater development in organisation and a more scientific supervision of the first stages in cardiac disease be evolved in this country?

HERPES ZOSTER AS A PRIMARY ASCENDING NEURITIS.

IN an interesting paper read at the forty-fourth annual session of the American Dermatological Association, Dr. Douglass W. Montgomery[1] set forth his reasons for believing that herpes zoster is the result of trophic disturbance following inflammation of a posterior root ganglion, the ganglionitis itself being due to a specific virus—probably streptococcal, as Rosenow and Oftedal suggested—reaching the ganglion by way of the skin and peripheral nerves. Dr. Montgomery draws attention in this connexion to the fact that only one ganglion is, or at the most two, and those on one side of the body, are affected in the overwhelming majority of cases, and points out the extreme improbability of a virus diffused in the general blood or lymph stream affecting one ganglion alone, while if two are affected it is singular that these should be close together on the same side of the body. This is his strongest argument in support of his theory that the virus enters the nerve terminals—nearly always sensory—in the skin, and ascends, possibly in the lymph spaces, along the nerve sheath until it reaches the ganglion belonging to that nerve, where it flourishes and causes an acute inflammation which in its turn causes the skin eruption. The fact that when more than one ganglion is affected it is invariably a neighbouring ganglion that is attacked is, of course, easy to understand in view of the way in which neighbouring nerves are frequently interwoven. Many of the other phenomena noted by various observers in connexion with this disease fall in most naturally with Dr. Montgomery's argument, such as the inflammatory engorgement of the regional lymphatic nerves observed by W. G. Hay, and more recently by Louis Ramond and Roger Lebel. Dr. Montgomery looks upon the characteristic adenitis which occurs in the most insignificant attacks of herpes zoster as a further proof that the mode of entry for the specific virus is through the surface of the skin of the region attacked, and suggests that the logical place in which to search for the specific micro-organism is this gland during its primary enlargement. A high degree of immunity appears to be conferred by an attack of herpes zoster, second attacks being almost unknown. Hence the frequent great severity of zoster eruptions in the area of distribution of the fifth nerve, and especially of the ophthalmic branch, is explained by Dr. Montgomery on the ground that the shorter the nerve, the shorter the time that the virus will require to reach the ganglion on the posterior or sensory root, and the less the immunity attained, with a correspondingly severe ganglionitis. Conversely, the longer the nerve, the longer the time the virus will take to reach the ganglion, during which period the patient is being actively immunised. Albion Hewlett pointed out many years ago that although 76 per cent. of cases of herpes zoster are of the trunk, he had only been able to find one case in which the muscles were affected. This is explained by the difficulty with which the virus would reach the motor centres. On the other hand, in herpes zoster attacks of the extremities, in which many of the muscles are comparatively superficial, and exposed to trauma, motor complications are relatively common; while in zoster ophthalmicus ocular paralysis is said to occur in about 7 per cent. of cases, the oculo-motor nerve, one of the branches of which is almost a cutaneous nerve, being the one most frequently affected. Dr. Montgomery discusses various other motor complications of the third, fourth, and sixth nerves, adding that he cannot imagine any virus circulating in the blood that would give rise to these combinations of sensory and motor nerve affections.

[1] Archives of Dermatology and Syphilology, December, 1921.

THE HISTORY OF NEUROLOGY.

THE FitzPatrick Lectures delivered by the late Dr. Leonard Guthrie, and only recently published in book form,[1] remind us that three years ago an accident deprived us of a colleague whose well-stored mind and sound judgment especially fitted him for the task of picturing those broader aspects of medicine which might be overlooked but for the wise provision of such lectures as these. Scientific medicine of to-day is in continuity with the efforts and mistakes of past generations, and a survey of the History of Neurology—the subject of the second series of lectures—by one who applied to it both wide learning and close personal knowledge, offers an opportunity to take a comparative view of current problems. It brings clearly before us earlier efforts to find a satisfactory theory of mental processes and link them to known anatomical facts, efforts which led to such speculative postulations as "animal spirit," "vital force," or the "materia vitæ diffusa" of Hunter; concurrently, the development of anatomical research resulted in knowledge concerning the anatomy and physiology of the central nervous system, which we now regard as established beyond question. In bringing past and present into relation with each other Dr. Guthrie expressed the opinions that "Psychology and neurology go no longer hand in hand," and "The whisper of the word 'functional' is sufficient to deprive a case of nervous disorder of all interest to the neurologist."

These opinions were expressed 13 years ago, and an audience of present-day neurologists would not accept them unreservedly—in fact, the repudiation by the neurologist of interest in "functional" nervous disorders has not taken place. But it is easy to find treatises on these disorders, written by psychologists, in which brain and nerve—the basic material of the neurologist—receive no mention. We are passing through a period of controversy which, however it may end, will find record as a landmark in this

[1] London: Eric G. Millar, Kensington. 1921. Pp. 160. 6s.

branch of medicine. Psychological theories as to the causation of mental and "nervous" disorders, to use the phraseology still current, are gaining ground; but the radical change involved in the conception that unconscious mental processes are the foundation of such disorders, and even of some organic disturbances, involves a difficult readjustment of ideas. Hence we find a difference of opinion as great as any that occurred between rival theories in the past. Without ignoring the attempts properly made to harmonise psychological theory and practice with physical facts and observations, we must recognise a tendency for clinical psychology to become divorced from pure neurology. The final verdict on psychological methods, and the position they may come to occupy in regard to medicine in general and neurology in particular, will certainly form subjects for the future historian.

FRENCH MEDICINAL SPAS.

A SPECIAL department in connexion with the Medicinal Spas of France has been started in the Office Français du Tourisme, 56, Haymarket, London, S.W., and full particulars, medical and otherwise, concerning French watering resorts are now given to inquirers. The bureau is receiving the sympathetic assistance of well-known British medical men, and the attitude towards English spas is duly recognised. While English medical men may naturally prefer to support English spas, there must come under their care many patients who, for various reasons, wish to go abroad, and want to know all the circumstances attendant upon continental treatment. The bureau at the Office Français du Tourisme is under the direction of Mlle. Blaise, who is well known to many members of the medical profession, and she is being advised by a representative medical committee. In this way the information provided as to the baths in France and the manner in which they correspond to spas in other parts of Europe will be trustworthy.

HEREDITY IN ENDOCRINE PATHOLOGY.

WITH increasing knowledge the problems presented by the endocrine glands, their functions and their maladies, increase in complexity and difficulty. We publish to-day in our French Supplement an interesting paper on certain aspects of these problems, by Dr. Pierre Vallery-Radot, of Paris, which deserves careful study from its suggestive character. He points out a fact familiar to many of our readers, that, in the early researches upon the chief endocrine glands there was a tendency to regard them as isolated organs with independent functions, whereas further experimental and clinical studies have established that they are inter-related structures working harmoniously together in health. This multi-glandular or pluriglandular conception is gaining support, but much further work is undoubtedly necessary before the various disturbances of the general endocrine balance can be evaluated and distinguished pathologically and clinically.

Dr. Vallery-Radot's communication is concerned with the ætiological factors in disease or disorder of function of these structures, and more particularly with any in which the thyroid is chiefly involved. He prefers to use the general term "dysthyroidism" for the results of thyroid disturbance, rather than to separate the effects of excess or failure of the thyroid secretion. In other words he emphasises the importance of the quality rather than the actual amount of the secretion. He mentions and briefly discusses some of the conditions which have been described as standing in an ætiological relationship to disturbances of thyroid function, notably acute infectious diseases, tuberculosis, syphilis, alcoholism, emotion, traumatism, and certain of the conditions associated with the reproductive functions in women—viz., puberty, menstruation, pregnancy, lactation, and the menopause. He comments on the frequency of the infections and of syphilis and the relative infrequency of exophthalmic goitre, and then develops the thesis that heredity takes a prominent place in the causation of thyroid affections, the transmission being by glandular tendencies rather than by any nervous inheritance or predisposition. Dr. Vallery-Radot allows that the facts concerning thyroid heredity are imperfectly known. He gives a brief historical résumé of the French literature on this subject and then brings forward his own observations. He differentiates similar and dissimilar heredity, the former term being applied to the appearance in direct or collateral descent of cases of exophthalmic goitre. Dissimilar heredity denotes the transmission of dissimilar forms of thyroid disorder and is also extended by Dr. Vallery-Radot to include the transmission of other endocrine disturbances. The evidence upon which these opinions are based is given in the article to which we refer and merits careful consideration. Dr. Vallery-Radot draws some interesting conclusions in regard to prophylaxis and treatment of these conditions in those manifesting familial tendencies to thyroid disorder, and these are worthy of consideration and trial.

SALARIES AND SEX.

OF those professions for which a definite course of training is obligatory there are two in which women already form an appreciable proportion of the total membership—viz., teaching and medicine. In the teaching profession the salaries payable to graduates holding identical qualifications vary with their sex. This differentiation was endorsed by a representative committee, which reported in 1920 and set up what is known as the Burnham scale of salaries, though presumably it is a survival from the time when the educational standards required of women were low. The medical profession can tackle this question unhampered by sex discrimination. There has been no period in the history of modern medicine when a woman has not had to spend at least the same amount of time and money on acquiring her professional qualifications as does a man.

There is a recognised principle to guide medicine. Whatever obstructs the advance of medical knowledge and practice ought, we are generally agreed, to be avoided; and conversely, whatever scheme or arrangement tends to advance medical knowledge deserves encouragement; our work is our first object of care. The advance of medical knowledge being independent of sex, the rewards should bear no relation to sex. In private practice the question does not arise. There are no fixed fees, and there can be no suspicion of undercutting, since it is known that the patient, for lack of other standards, is apt to judge the quality of service rendered by the fee charged for it. But obviously it would be a fatal mistake to allow women to undercut men in public health or any other branch of medical work, and so allow economic rivalry to creep in and jeopardise the proper pursuit of medical aims. Medical women are as anxious to observe the guiding principle as are medical men to enforce it, and it is to be hoped that any difficulties which have arisen will be speedily overcome.

INDEX TO "THE LANCET," VOL. II., 1921.

THE Index and Title-page to Vol. II., 1921, which was completed with the issue of Dec. 31st, will shortly be published. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2.

HUNTERIAN SOCIETY.—The second Hunterian Society lecture will be delivered by Mr. Walter G. Spencer, entitled Some Local Results of Dental Infection, at Sion College, Embankment (close to Blackfriars Bridge) on Wednesday, Jan. 11th, at 9 P.M. All members of the medical profession are cordially invited to attend.

A SIMPLE PRESENTATION OF THE GENERAL PROPERTIES OF COLLOIDS.*

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IT is not an easy matter to give a definition of colloids sufficient to mark them out distinctly from other things. In point of fact, so far as we know, any chemical substance may be brought into the colloidal state under appropriate conditions. Colloids, then, are not a particular class of compounds, and it is more correct to speak of the "colloidal state" of matter. In practice, the most convenient property by which the colloidal state can be recognised is that the material in such solutions exists in particles of dimensions so large as to be unable to pass through pores of the size of those in membranes like parchment paper or the wall of the blood capillaries. Nevertheless, there is also an upper limit to the size of these particles, above which they fall as inert masses, leaving the body of the solution free.

We can learn most of the properties of the colloidal state by considering, in the first place, the case of gold. Gold was, indeed, the first metal brought into the colloidal state by Faraday, who recognised the nature of the solution, although the name "colloid" had not yet been introduced by Graham. It is clear that pure gold in the form of visible lumps may be said to satisfy the criterion of not passing through parchment paper. But no one would think of calling a mixture of water with gold in the shape of shot a colloidal solution. The particles must be much smaller in order to show the properties implied. At the other extreme, it is equally clear that we must not go so far as separation into molecules, because these would easily pass through parchment paper; they would be in what is known as true solution and devoid of the characteristics of the colloidal state. At some stage of subdivision between the two extremes mentioned there are particles of gold larger than the pores of parchment paper, but too small to be visible to the naked eye. They are, indeed, small enough in this colloidal state to pass through the pores of ordinary filter paper. How can we obtain these minute particles? Only with great difficulty, if at all, by actual mechanical disintegration. Electrical forces may drive off from gold electrodes sufficiently minute particles, as in the electrical method of preparing certain metallic colloids. But by chemical means, by the action of reducing agents, salts of gold can be decomposed to the metallic state, and Faraday showed that in dilute solution in pure water what appeared to be a solution of metallic gold was produced by this means. When observed by transmitted light these solutions had the red or purple colour of very thin films of gold. But when a powerful beam of light was sent through them and looked at from the side its course was marked by a luminous track, while the colour of the light reflected, or rather diffracted, was the yellow one of gold in mass. (Diffraction is a phenomenon due to the wave form in which light is propagated and may be roughly described as the property of waves to bend round corners; this may produce blurring and incorrect definition and accounts in some measure for the unsatisfactory nature of certain photomicrographs.) This yellow track was correctly interpreted as being due to the presence of minute solid particles of gold. At a later date Tyndall noticed that the light was polarised, showing that many of the particles had dimensions less than that of the wave length of the light projected into the solution. This gives some idea of the order of dimensions of colloidal particles. Although these values are very minute in comparison even with microscopic structures, each particle may contain several thousand individual molecules. But since gold is much heavier than water, we may pertinently ask why these particles remain in permanent suspension. There are two chief causes—Brownian movement and electric charge.

Brownian Movement.

If the Faraday phenomenon of the luminous beam, referred to above, is examined by a microscope (so-called "ultra-microscope") the separate particles may become visible owing to the light diffracted from them, although they appear much larger than they really are. They will be seen to be moving about in all possible directions and in an apparently disordered manner. It may suffice to say here that, after all previous hypotheses had proved incorrect, it was shown by Perrin that the movement merely renders visible the molecular movement postulated by the kinetic theory of gases and liquids. Consider first the water in which the gold particles are suspended; the molecules of which it consists are in continual movement, hitting against one another and reinforcing or reversing the direction of each other's motion. Similarly, the separate molecules or ions (i.e., electrically charged molecules or atoms) of a substance present in true solution are hit by those of water and present the same phenomenon. If, however, a visible grain of solid matter be dropped into the water, its size is so great compared with that of the water molecules that it is hit on all sides simultaneously by such an enormous number of molecules, moving in all imaginable directions, that their effects mutually oppose one another; there is no resultant left to counteract the action of gravity and the grain falls to the bottom. On the other hand, when a particle is small enough to be hit simultaneously by a much fewer number of water molecules one or more of these will be left unopposed, and the particle will receive an impulse driving it in some particular direction. It will not, for example, fall further than a minute distance before it is driven upwards again, and it is therefore kept permanently from deposition. Brownian movement is, therefore, the result of the molecular movement of the water molecules, and its importance lies in the state of suspension of heavy particles so maintained. It is incorrect to say, as is done in some commercial pamphlets, that Brownian movement is essential to catalytic action. It increases the catalytic action of the surface of the material of which the particles are made simply because of the large increase of this surface produced by the fine subdivision. In most industrial processes the catalyst is not in colloidal solution but is immobile.

Electric Charge.

The facts that colloidal particles have dimensions comparable with the pores of parchment paper and that they consist of a large number of molecules united together lead us to expect that they will show the properties of bodies possessing surface. Now one of these properties is that of taking on an electric charge, differing in sign and magnitude according to the liquid in which such bodies are immersed. In water most substances are electrically negative, some few are positive. If two electrodes, one being positive, the other negative, owing to their connexion with a battery, be placed in a colloidal solution of gold, it will be found that the particles are attracted to the positive pole. Since opposite charges attract and similar ones repel, it is clear that the gold particles possess a negative charge. We may consider next the effect of this fact as they tend to hit one another in the course of their Brownian movements. Their similar charges repel and prevent their contact. Whereas, if the particles were devoid of electric charge, a chance encounter would sometimes result in their sticking together and gradual increase in size until precipitation occurred. The electric charge can, indeed, be abolished in certain ways, as we shall see later. To understand the possible means by which an electric charge is produced or removed a few words must first be said as to the phenomenon of adsorption.

The Phenomenon of Adsorption.

Where a solid, liquid, or gas is in contact with another with which it does not mix, with a separate

* We commend to practitioners who wish for further information on colloids Prof. Bayliss's Introduction to General Physiology.—ED. L.

"phase" as it is called, the molecules making up the surface layer are exposed to forces different on one side from those on the other. There results a state of tension known as surface tension, the force exerted by which can be measured by various methods. When this tension is able to diminish, work can be done by it and through this, in addition to some other sources, a surface possesses energy which can be increased or diminished. Now we know by experience that, though the total energy content of the universe is a constant quantity, *free* energy, such as is present here (and by "free" energy we mean that which can be used for work) always takes the opportunity to decrease whenever it is possible to do so. This tendency is connected with the peculiar position of heat energy in the present arrangement of the universe, and is expressed in the second law of thermodynamics or energetics. The bearing of the fact on the case before us is this. Certain substances, such as bile-salts or saponin and many others present in solution, say in water in contact with a solid surface, are able to decrease the surface tension at the place of contact. This means a loss of free energy, and the greater this loss the more of the solid substance is concentrated on the surface. Such a concentration or deposition is known as "adsorption." The mechanism of the process, such as is suggested in theories put forward by Langmuir, is complicated, and it is sufficient to remember that not only surface tension of the mechanical kind but any process resulting in surface energy leads to adsorption of a substance if energy is thereby decreased. Now the substance adsorbed may be in the form of electrically charged ions, arising from dissociation of an electrolyte (a solution in which the molecules are split up into ions carrying electric charges). When ions of one sign are adsorbed in preference to those of the opposite sign, owing to the fact that free energy of some kind is reduced to a greater extent by this process, the layer of ions will confer on the surface a charge of its own sign. It is probable that there are other sources of electric charge, as by electrolytic dissociation of the material of the surface itself or by something akin to frictional electricity. But the important facts are the existence of the charge and the properties due to its presence.

Action of Electrolytes.

Faraday noticed that the gold particles in his preparations were aggregated and thrown down by the addition of sodium chloride. Why does this happen? We have seen that these gold particles have a negative charge and that this charge assists in preventing them from uniting and falling to the bottom. In solutions of electrolytes (salts, acids, or bases) there are present by electrolytic dissociation both anions and cations—that is, ions with opposite charges and in equal numbers. In sodium chloride we have sodium-ions with positive charges and chlorine-ions with negative charges. If chlorine-ions were deposited on the particles the negative charge would be increased and, with this, the free energy, because an electric charge is a form of energy. This process will therefore not occur. Whereas deposition of sodium-ions neutralises the charge, the particles aggregate and fall down, carrying with them the adsorbed positive ions. Various colloids differ much in their sensibility to electrolytes, the metallic ones being very sensitive and unstable. One colloid can also discharge and precipitate another one if they possess charges of opposite signs, as would naturally be expected. This fact has some practical importance.

Protection.

Faraday also found that the addition of a trace of gelatin made the colloidal gold far less sensitive to foreign salts. It appears that this is due to the adsorption of a layer of gelatin by the surfaces of the particles. They thus become equivalent to gelatin itself. Gelatin belongs to a class of colloidal substances which are not nearly so sensitive as the metallic colloids. They are known as "emulsoids" and will be referred to later. Many other compounds, such as the various products of hydrolysis of proteins—namely, peptones and so on—are also effective, and commercial preparations of colloids, with the exception of those made by the electrical method, contain protectives of some kind. Unfortunately, many of these protectives have themselves a powerful physiological action, so that, unless it is known what is present and what its effect is, any therapeutic effects noticed cannot be claimed as due to the metallic colloid itself. The absence of a protective colloid is therefore an advantage, and those preparations made by the electrical method instead of by a chemical one would be preferable, except that they are apt to deposit on keeping, on account of the difficulty of keeping all foreign electrolytes out of the solution. When used intravenously or intramuscularly the proteins of the blood and tissues act at once as protectives against the salts also present, and there is no need for an artificial protective. If sodium chloride or any other salt is added to the preparation as sold in order to make it "isotonic" with blood, that is of the same osmotic pressure to prevent the occurrence of hæmolysis, it would be necessary to have a protective for the colloid. But the small doses used present no risk and, in any case, a non-electrolyte such as sugar would be as effective as a salt and require no further protection.

Such a protective as the arabinic acid of gum acacia is not in organic combination with the colloid. It is merely adsorbed, and the slow action is due, not to its slow release from combination, but to another cause, as we shall see.

Nomenclature.

The suspended particles of a colloidal solution, being separate from one another and the liquid surrounding them being in one continuous whole, it is easy to see the appropriateness of calling the former the "dispersed" phase and the latter the "continuous" one. They are also known as "internal" and "external," the internal one being enclosed by the external one. These phases may be solid, liquid, or gas, and of a great variety in chemical nature. Some examples are:—

Internal or dispersed phase.	External or continuous phase.	Example.
Gas.	Liquid.	Foam.
Liquid.	Gas.	Fog.
,,	Another immiscible liquid.	Emulsion: milk.
,,	Solid.	Gelatin jelly.
Solid.	Gas.	Tobacco smoke.
,,	Liquid.	Ordinary colloidal solutions, gold, arsenious sulphide.
,,	Another solid.	Ruby glass.

When both phases are liquid there is a possibility of two systems, different in their physical properties according to which is the continuous phase. Thus in milk, oil is the dispersed phase, the watery solution the continuous one; in butter, oil is continuous, water is in droplets.

Suspensoids and Emulsoids.—An important distinction must be made between what are known as "suspensoids" and those known as "emulsoids." The dispersed phase in the former is in the form of solid particles, such as gold, sulphur, ferric hydroxide and so on, free from water. They are more sensitive to electrolytes and therefore less stable than the latter class, which includes gelatin, albumin and other proteins, silica, and others. Here the dispersed phase contains more or less water, absorbed ("imbibed") into the solid particles. The amount of water or degree of swelling can be altered by the presence of salts or other electrolytes. But it should be remembered, in view of such theories of œdema, &c., as those of Martin Fischer, that a fairly high strength of acid is necessary to produce any notable effect. Emulsoids are far less sensitive to this effect of electrolytes than are suspensoids to the electrical action of ions. As before noted, emulsoids are also less sensitive to precipitation by electrolytes, as would be expected from the fact that the phases are much closer in composition than in the suspensoids, both containing water and both containing dissolved solid differing

mainly in the relative proportion of the two. Hence phenomena at the boundary surface inclusive of surface tension and electric charge are of less magnitude.

A Critical Examination of the Therapeutics of Colloids.

On account of statements made in commercial pamphlets advertising particular preparations, it is necessary to examine critically the question of the chemical and physical activities of colloids with reference to their alleged therapeutic value.

Chemical Activity.—Substances in the colloidal state are comparatively inert, as may be realised when we remember that each particle contains a large number of molecules and that only those on the surface are capable of reacting chemically with other molecules. Gold or ferric hydroxide in the colloidal form do not act chemically otherwise than as gold or ferric salts in solution, but they act very slowly and gradually. This is probably the only reason for using this method of administration, but it may be of real importance. The fact that colloids are in the same physical state (isomorphic) as some of the body constituents is of no significance. Many of the most indispensable substances, such as sugar, calcium, and above all oxygen, are not in colloidal form. Food which is mainly colloidal is changed by digestion into "crystalloid" material in true solution before it can be absorbed and assimilated. It may be noted that one of the conditions for ready conversion into the colloidal state is relative insolubility in the medium of the continuous phase. The heavy metals have powerful pharmacological effects and can only be given in minute doses, which are soon excreted or otherwise placed out of action. The insoluble particles of the colloid continuously give off into true solution traces of their chemical constituents, and so afford a renewed supply. The toxic action on microscopic organisms of traces of copper dissolved from the metal has long been known. In certain cases, such as that of the free bases of the alkaloids, cocaine, quinine, &c., which are not very soluble in water, it can be shown that the activity of the colloidal preparation is neither more nor less than that of the amount of drug present in true solution.

It may safely be stated that up to the present no good evidence has been produced that the chemical or pharmacological action of substances in the colloidal state differs from that in true solution, otherwise than in the matter of gradual slow effect.

Physical Activity.—The striking characteristic of the colloidal state being the existence of an enormous extent of surface, it remains to inquire whether the properties dependent on this play any important part in the therapeutic action of substances in this state. One of these properties is the electric charge, and statements have been made, without proof, that such vague phenomena as capillary attraction and penetrative power are increased thereby. If by the latter is meant diffusion through membranes the conversion into the colloidal form is actually a disadvantage. Of course, if an electro-positive colloid, such as ferric hydroxide (ordinary colloidal iron), is injected into the blood, which contains electro-negative colloids, mutual precipitation will occur with serious results. But no satisfactory evidence has yet been produced that the electric charge as such has any physiological action. The fact that colloids do not diffuse through the walls of the blood-vessels renders possible the use of certain colloidal dyes in the estimation of the volume of the blood. Such a dye is "vital red" and "Congo red" which, as shown by D. T. Harris, has the advantage of being even less diffusible than vital red while being easily obtained.

Another physical property of physiological importance is the osmotic pressure exercised by certain emulsoid colloids, gelatin, gum arabic, and the proteins of the blood. It is this property which prevents the rapid loss of fluid from the blood by filtration through the capillary walls and controls the production of urine. Added to saline solutions gum arabic prevents their loss from the blood which otherwise takes place very quickly after intravenous injection. This property of colloidal osmotic pressure is perhaps the clearest case that can be produced in support of the physiological importance of the colloidal state of substances in solution.

THE DEVELOPMENT OF THE ARMY MEDICAL SERVICE.[1]

A CONSIDERATION of the lines along which the Army Medical Service evolved between the end of the South African War and the mobilisation of 1914, a period of 13 years, is essential to an understanding of its present efficiency.

Outside England the most important influences of the period were the Russo-Japanese War of 1904–05 and the Geneva Convention of 1906, but within this country the War Office was not inactive. During the 13 years commission after commission was set up; every section of the problems involved in medical organisation in case of war was studied, reforms were planned, approved in principle, criticised and amended in detail, expanded and rearranged, until at last the Army Medical Service reached a stage when it was indeed prepared. In August, 1914, the personnel for the medical service of the Expeditionary Force assembled at its various centres; took over the stores there waiting, and went abroad; and it was found that everybody and everything needed for the first fortnight of the war had been provided, excepting only ambulance-trains which were projected for 1915.

Major-General Macpherson's historical survey is a great testimony to the work of the Army Medical Service; indeed the only one person who has an error in judgment quoted against him is a civilian. There can indeed be no doubt that ever since the South African War the General Staff and the Army Medical Service had worked wisely and well together. Their sagacious foresight; their careful consideration of difficulties likely to arise in the transfer and treatment of wounded, and in the prevention of disease on active service; and their determination that everyone, even remotely concerned, should in peace-time understand the scheme, and in war-time should help it to work—all this prepared the way for a success in the prevention of disease and a speed in the evacuation and treatment of the wounded that had never before been attained in any great war. The duration of the war and the course of the operations could not be foreseen.

THE EVOLUTION OF AN ORGANISATION.

Of the steps which led to the development of this organisation one of the earliest was the setting up of the Army Medical Advisory Board with four civilian medical members to advise on medical, hospital, and sanitary matters. The establishment of a clearing hospital to take over the wounded from the forward medical units, the field ambulances, and evacuate them to the base hospitals soon came under consideration. A natural development was the casualty clearing station and the ambulance convoy. Once the method of dealing with wounded had been settled, the prevention of disease in war called for attention, and the Advisory Board recommended that sanitary officers should be sent to corps and divisions. In 1905 lectures on sanitation were given to cadet officers at Woolwich and Sandhurst, and also to students at the Staff College. In 1906 a committee was set up to discuss the food, training, and clothing of the soldier in relation to the work expected of him. The question of water-supply was considered, and an N.C.O. and men of the R.A.M.C. added to each unit to take care of the water-carts. Each unit had to provide a sanitary squad to see to all sanitation within its area, but sanitary detachments of the R.A.M.C. were provided to take care of ports, rail-

[1] Official History of the Great War. Medical Services. General History. By Major-General Sir W. G. Macpherson, K.C.M.G., C.B., LL.D. Published by H.M. Stationery Office. 1921. Pp. 463. Price £1 1s.

heads, rest-camps, &c., while a sanitary commission, consisting of a general, an R.E. officer, and an R.A.M.C. officer, was provided to accompany any expeditionary force. Anti-typhoid inoculation was adopted as a routine in peace-time, voluntary indeed, but popularised by lectures. Specialists in bacteriology were appointed to all the larger hospitals in 1908, and thus an investigating staff was ready to deal with new epidemics.

Additions to Personnel.

All these energies required more men to carry them out. More officers were taken into the R.A.M.C., a reserve was arranged for, particularly by the formation of medical companies of the Officers Training Corps, and, moreover, there were the new medical establishments of the Territorial Force. In addition, infantry reservists were allowed to transfer to the R.A.M.C., and arrangements were made for such recruits after one year's training to go to reserve for 11 years. But all these would go abroad with any Expeditionary Force, so men were required to serve in the home hospitals on the outbreak of war. The Home Hospital Reserve was sanctioned in 1908, under the St. John Ambulance Brigade in England, and St. Andrew's Ambulance Association in Scotland. The Territorial Force units had their associated medical details, but no clearing hospitals or base organisations. To meet this need, Voluntary Aid Detachments were formed.

Meanwhile the Army Nursing Service had not been neglected. A Board had been established, a matron-in-chief appointed, and Queen Alexandra's Imperial Military Nursing Service inaugurated in 1902. A reserve for this service was established in 1910, and a civil hospital reserve in 1911. A Territorial Force Nursing Service was also organised, composed mainly of the matrons and nursing staff of the large civil hospitals. While these developments were progressing steadily, the R.A.M.C. came more directly into touch with the civil profession, especially through the new school for the R.A.M.C. at Millbank, with the Advisory Council as its governing body, and some of the leading London medical men amongst its teachers. Its permanent buildings were opened in 1906, and in 1907 Queen Alexandra's Hospital next door was taken over. The Millbank school was recognised in 1908 as one of the medical schools of the University of London, and by associating officers of the corps with the civil profession exercised far-reaching influence on their joint work.

Coördination between Medical and other Army Officers.

The need for mutual understanding between medical and staff officers on active service caused a great change in 1908, when it was recognised that a medical officer should be responsible for the feeding, clothing, &c., of his men, and medical officers were subsequently taken on staff tours, and staff officers were enabled to study medical organisation. Medical officers were attached to the General Staff to report on foreign medical services, and medical manœuvres were held in 1910 in England and in 1913 in India. Medical officers from the Dominions also underwent instruction, so that a system was evolved throughout the Empire, based on similar principles.

AFTER AUGUST, 1914.

These preparations bore ample fruit when mobilisation orders were issued on August 4th, 1914. Each medical officer and man had precise instructions as to the unit or appointment he would join. There was practically no hitch. Of the 6000 reservists called up, only 17 failed to appear, and all the equipment was available except, as before mentioned, the ambulance-trains. Motor-ambulance convoys were at once seen to be necessary and were sent abroad, the first on August 22nd, 1914. The Home Hospital Reserve was in the military hospitals by August 10th. On August 4th there were 7000 beds equipped; at the Armistice 364,133, fifty-two times as many; and by the end of the war the great R.A.M.C. training school at Blackpool had about 9000 men, and gave them training in general subjects and sanitation, besides courses of special instruction for cooks, clerks, X ray and laboratory assistants, and in anti-gas methods.

The Dental Service.

Dental defects existed in some 70 per cent. of the recruits, therefore dentists became necessary. Only 12 could be sent to France in November, 1914. In August, 1915, an advisory dental officer was appointed to each command at home; in March, 1918, an inspecting dental officer was established on the staff of the Director-General at the War Office; 831 dental officers were in employment at the Armistice, and dentists are now an integral part of the military medical organisation.

Civilian Medical Help.

Two consulting surgeons were sent abroad in September, and many more were appointed later, and, in addition, specialists were assigned to the larger hospitals from volunteers amongst civil practitioners. Units for later divisions were formed from the Territorial Force.

The need for more medical officers became extreme in January, 1918, when more than half of the medical profession at home were in the army. Great help had come from the United States, which sent six hospitals in May, 1917, and 1253 United States medical officers served with British units from May, 1917 onwards, in France and Italy. United States nurses also were distributed among British hospitals; eventually they were all transferred to France. Complaints were made in 1917 that, though the army alleged it had not enough doctors, it was not making full use of those it had, and a commission was sent to investigate this point. Its report was not published, but it was unable to suggest practical measures for effecting economies or for a better distribution of medical officers.

A Few Special Points.

Equipment.—The providing of equipment was a grave responsibility. In all, £12,000,000 worth of stores were purchased during the war, and only £70,000 worth were lost by enemy action. 1,086,000 thermometers were issued during the war, and 4000 X ray tubes during the last two years, while in 1917 quinine was issued to the amount of 5½ tons monthly. The store department was gratified to find its accounting methods were regarded as so efficient that they were copied by the Finance and Audit Branch of the War Office—a great credit to the Department.

Infectious Diseases at Home.—The only important infectious diseases at home among the troops were cerebro-spinal fever and influenza. Night-soil was at first a difficulty, but latterly was treated by incineration when possible, and this sheds a side-light on contractors. A contractor asked 6*d.* per each removal of latrine buckets, but when an incineration system was threatened his price fell to a penny each.

Special Expeditions.—The later chapters of the book deal with special expeditions, with Tsingtau, where the kindness of the Japanese, always ready to give medical assistance to British troops, is mentioned; with Malta, where the hospitals held 400 beds in 1914 and 20,000 in 1916. This could not have been allowed had Malta fever still been a menace to the troops, and the credit of stamping out this scourge is due to previous work of the R.A.M.C. In Cameroons the chief diseases were dysentery and pneumonia, the latter especially amongst ill-clad carriers, who, by the way, refused to carry stretchers except, with a board between the handles, on their heads. The chief cause of inefficiency here was tropical ulcer attacking men who did not wear boots and trousers. In South-West Africa the great difficulty was want of water, and disease was rare. Flies were kept under control here with conspicuous success by a sprayed solution of arsenic and sugar, of each half a pound in a gallon of water.

Venereal prophylaxis does not convince Sir W. Macpherson, who believes that there was more venereal disease in those contingents which made a great feature of prophylaxis than in the British Army.

MEDICINE AND THE LAW.

THE BRITISH JURY.

THE war, with its demands upon man-power, caused a diminished employment of juries generally, and, in the case of inquests, did away with them temporarily for all occasions except those when a question of murder or manslaughter was likely to arise. Useful experience was thus gained, and it would seem that justice has been as competently and satisfactorily administered as before. But the jury is, or has been, a highly prized institution, currently referred to as the Palladium of our British liberty, and the idea that such an institution might more reasonably be regarded as useless or even detrimental to the public good is no doubt inconceivable to many. Medical men are deeply interested in this question, for they are more likely than many others to be involved in litigation as witnesses. They supply in our courts the greater proportion of the expert evidence given, evidence frequently not a little beyond the comprehension of the average juror, in considering whose capacity as a class account must be taken of jurors in country districts as well as in cities, including those summoned to attend county courts, courts of assize, and quarter sessions, and coroners' courts.

An interesting and lucid article by an unnamed King's Counsel appeared in the November number of *Cornhill*, which we commend to the consideration of those who desire to look at all sides of the subject. The author, whose cited examples show that his practice has extended over a considerable period, does not uphold the "Palladium." He delivers a damaging attack upon it, illustrated by examples of its failure to maintain the cause of justice, his comments being based either on his personal observation or on published reminiscences of Sir Edward Clarke and Sir E. Marshall Hall. "K.C." deals with civil as well as criminal trials, and, with regard to the former, he sums up his position by stating that a plaintiff who wants a jury naturally wants to do the best for himself, and continuing, "It really comes to this, that he does not want a fair trial; he wants an unfair one and with a jury he gets it." Of course, in the Chancery Division and in a large number of cases in the King's Bench Division and county courts, as he points out, justice is satisfactorily administered by a judge sitting alone.

We need not remind our medical readers of the kind of actions incidental to their profession in which they are liable to figure as plaintiffs or defendants, nor of the kind of evidence which they are called upon to give in other people's actions or in criminal trials. We can hardly believe that they would not rather, as a rule, appear before a judge sitting alone, and would not consider him better able to understand their evidence and give effect to it than even a special jury. "K.C." cites in the *Cornhill* an instance of a jury which rejected the evidence of a medical witness because one of its members had seen him reading the *Sporting Times* outside the court while waiting to be called. This may be an extreme instance of unreasonable prejudice, but it is a recorded example, and it is to be remembered that it is not often that we are allowed to know how and why juries arrive at their verdicts, conclusions which we feel are wrong and unjust.

With regard to coroners' courts, Dr. F. J. Waldo, coroner for the City of London, attaches great value to the jury. Coroners, however, are by no means unanimous on the point, and it would appear reasonable to suppose that so far as medical evidence is concerned, a coroner with medical qualifications would be better able to appreciate its value than any jury, and that even a non-medical coroner must acquire, by constantly hearing it, a better knowledge of its value than a number of men without any qualification whatever, selected at random from a not over-educated public.

At the conclusion of four inquests upon cases of violent death, Dr. Waldo recently called attention to the fact that at the end of next February the Juries Act, 1918, will become inoperative, and the power of coroners to sit in a large number of cases without juries will cease. Dr. Waldo questioned the success of the Act in the case of deaths of a violent and unnatural character. He considered that the confidence of the public would best be guaranteed by the retention of the jury in all cases, at least, of deaths due to violent causes. He also believed that the presence of a jury added materially to the publicity of the proceedings, which was, in his experience, one of the most useful features of the coroner's court.

AUSTRALIA.

(FROM OUR OWN CORRESPONDENT.)

Bubonic Plague.

THE progress of plague infection in Queensland, though not yet alarming, is disquieting. From the first it was recognised that rat infection existed in practically all the principal ports on the Queensland coast, and cases in human beings confirmed the observation. The latest returns published by the Commonwealth Health Department record 18 cases and 9 deaths from plague in Brisbane; 24 cases and 14 deaths at Townsville; 11 cases and 6 deaths at Cairns. Two were discovered inland, but the patients were found to have come from the coast. Considerable anxiety has been aroused by the death of an elderly man in Brisbane from a pneumonic form of plague. Since the above returns were made a few additional cases have been reported in Brisbane and Townsville. Infected rats continue to be discovered, but not in great numbers; every preventive measure which science can suggest is being carried out, and a conference of health officers has been summoned to coördinate further plans. The outbreak has considerably disorganised coastal shipping.

Venereal Disease.

The inaugural meeting of the Victorian Society for Prevention of Venereal Disease was recently held in the Melbourne Town Hall, the chair being taken by Dr. B. Kilvington, President of the Victoria Branch, B.M.A. Addresses were given by Sir James Barrett, Dr. Constance Ellis, Mr. G. A. Syme, and others, and office-bearers were elected. The association is to comprise laymen and professional members, and is to be educative in character. Judging from the number of the laity anxious to hear the proceedings it would seem that public interest is more general than might have been expected. The legislation on venereal disease passed in several of the Australian States does not appear to have been productive so far of any notable result. All that seems established is that there will always be a reluctance to notify female cases. Western Australia has abandoned compulsory notification altogether.[1]

Cost of Living.

The Council of the Victoria Branch, B.M.A., recently considered the question of salaries paid to medical men in public positions. By request of the members of the University medical staff the Council decided to draw the attention of the University Council to the fact that the professional salaries paid in the medical school were inadequate. The University Council has replied that it cannot consider any revision of salaries owing to the difficulty of finding sufficient income for present maintenance.

Melbourne Hospital.

The committee of the Melbourne Hospital recently approached the State Treasurer with a request for financial assistance, and intimated that the institution was in serious difficulty, having an overdraft of some £20,000 on general maintenance, notwithstanding that strict economy was followed. The Treasurer (Hon. W. M. McPherson) was not impressed with

[1] THE LANCET, 1921, ii., 1198.

the possibility of acceding to the request, but promised to lay it before the Cabinet. When the Melbourne Hospital was rebuilt some years ago space had to be acquired by carrying the ward-blocks to six stories. It would be interesting to learn how far this structural arrangement is responsible for increased cost of administration.

Public Charities.

The war-time custom of collection of money by street demonstrations has been continued by the various charities, and these special efforts have now come to be regarded as a nuisance. Protest is being made against their continuance; in Victoria a permanent committee has been suggested to supervise public collections for charities, and in New South Wales the Labour Government has restricted special street collections to two days in the year.

Dec. 15th, 1921.

CZECHO-SLOVAKIA.

(FROM OUR OWN CORRESPONDENT.)

International Venereal Diseases Conferences at Prague.

AN international congress against venereal diseases was convened in Prague by the League of Red Cross Societies. The League was represented by its secretary-general, Dr. René Sand, and by the Director of the Division for Venereal Diseases, Colonel T. F. Ritchie. Jugoslavia was represented by Drs. Georgijewitch and Zujovic, Poland by Dr. Bronislavski, Bulgaria by Prof. B. Béron, Greece by Prof. Photinos, and Czecho-Slovakia by several delegates.

The congress was opened on Dec. 5th by Dr. Procházka, representing the Czecho-Slovak Red Cross. Addresses were delivered at this opening session both by Dr. Vrbensky, Minister of Health, and by Mr. Haberman, Minister of Social Welfare. All the foreign delegates presented reports concerning the progress of the campaign against venereal diseases in their countries. Dr. Ulrich lectured on conditions in Czecho-Slovakia and outlined the State programme drawn up by the Czecho-Slovak Society for Combating Venereal Diseases.

The session of Dec. 6th was devoted to the discussion of general medical problems. The discussion was opened by Prof. F. Samberger, of the University of Prague. He urged a better education for doctors who wish to specialise in venereal diseases, recommending a reform in hospitals where patients are unemployed although their condition warrants some employment. He advocated the creation of workshops for venereal disease patients in connexion with hospitals. On the 7th Prof. Záhor read a paper on the education of children in sexual matters, emphasising the desirability of having the subject systematically, but inconspicuously, presented to the child before the latter leaves school at the age of 14 years. It was not necessary to teach sexuology as a separate subject; it could very well be inserted into natural history and biology. The methods of dissemination of information on venereal diseases were also discussed. In an introductory paper Prof. Tryb emphasised the importance of instruction in this field by physicians only, and went as far as to recommend a law making it a penal offence to speak on these subjects without sufficient knowledge. The report on the campaign in the Czecho-Slovak army was presented by Colonel Vesely. Extensive educational measures, and compulsory self-disinfection, were the essentials of the army programme. Dr. Odstrcil advocated a wider application of self-disinfection, especially during the post-war period, when venereal diseases have spread to a greater extent than they have ever done before. It was interesting to note that there was no opposition from the women who attended the congress.

The last session, on the 10th, was devoted to discussing the notification of venereal diseases and control of infected individuals, and was opened by Dr. H. Pelc, of the Ministry of Health. It was felt that in spite of the arguments in favour of compulsory notification, it was not advisable for the congress to recommend this action to the Governments represented, in view of the fact that public opinion would probably not support it, and that if the patients lost their confidence in professional secrecy there would be an increase in quackery. The same day resolutions were passed embodying the essential features of the discussions, and it was decided to forward these to the respective Governments.

On the social side members of the congress were entertained at the residence of the president by his daughter, Dr. Alice G. Masaryk, president of the Czecho-Slovak Red Cross, and at a banquet given to them by the Ministry of Health. Several excursions to institutions of medical interest were also arranged for the benefit of the foreign delegates. The general impression is that the congress will result in a more rapid development of the campaign against venereal diseases in Central Europe.

Prague, Dec. 21st, 1921.

Public Health Services.

Prophylactic Treatment under the Insurance Acts.

A SYSTEM which removes economic hindrances to the access of patient to doctor and tends to bring him more frequently under skilled observation before disease is fully developed would mark a great advance in preventive medicine. Such a system it was hoped to find within the compass of the Insurance Acts. A noteworthy decision was given recently by the Committee of Inquiry appointed by the Scottish Board of Health to hear and determine the question whether prophylactic treatment really falls within the scope of treatment to be given by a panel practitioner under his agreement with the insurance committee. The Committee of Inquiry was held in Edinburgh, and consisted of Sir Donald MacAlister, president of the General Medical Council, associated with a Sheriff and an ex-Provost. These three determined that the expression "treatment" in the first clause of Section 8 (1) of Part 1 of the First Schedule of the Medical Benefit Regulations includes treatment for the prevention as well as for the cure of sickness. They further point out that the word "patients" is defined in Section 3 of the agreement as including all insured persons who are on the practitioner's list. Section 8 (1) therefore is not expressly confined to persons who are suffering from any ailment. The panel committee at which the case arose had contended that the true reading of the section was to limit treatment to patients who are suffering from an ailment; on this view medical benefit was confined to curative treatment of an ascertained disease, and did not extend to treatment designed to protect against the risk of contracting a disease. The judges decided, however, that this restricted interpretation was not justified. They referred to the prophylactic work done by most practitioners in their ordinary day's work, and pointed to the title of the Insurance Act as "An Act to provide against Loss of Health" and "for the Prevention and Cure of Sickness." Section 1 (1) of the Act does in point of fact provide that insured persons shall be entitled "to the benefits in respect of health insurance and prevention of sickness conferred by this part of the Act." Should this decision stand it is clear that insurance practitioners are brought by their agreement into the domain of preventive medicine, and constitute a link between practitioners of clinical medicine and the administrative medical officers appointed under the Public Health Acts.

Approved Societies and Voluntary Hospitals.

Hospitals have not appealed in vain to the approved societies under the Insurance Acts, and it is now announced that certain of the larger societies will shortly put into operation schemes for the financial assistance of voluntary hospitals. The joint scheme of the Prudential and National Amalgamated Societies consists in the formation of a pool by putting aside

each quarter a portion of disposable surplus. This figure was then divided into the total number of weeks claimed by the respective hospitals, the quotient giving the unit of payment per week. On such a plan each hospital treating members of these societies would get its fair proportion of the pool. It was expected that this scheme would come into operation on Jan. 1st. The Hearts of Oak Benefit Society, on the other hand, contend that their disposable surplus would be more equitably distributed if all the members received additional cash benefits than if the hospitals received it in respect of the 5 per cent. of their members who become in-patients every year.

Canvassing and Free Choice.

Canvassing by practitioners either directly or by means of agents has always been regarded as unprofessional conduct since this term was defined, and in a case recently heard before the London Local Medical Committee, where the canvassing of another practitioner's patients was established, it was decided that such action was prejudicial to the efficiency of the medical service. Canvassing is contrary to the traditions of a profession in which patients should be attracted to the doctor of their choice by their own knowledge of that doctor's reputation and ability. The time-honoured custom of disposing of practices may appear to take away the choice of doctor on the part of the public, but it is only the goodwill of a practice that can be bought or sold, and in assessing this goodwill much has always depended on personal factors outside a mere business transaction. The recent alteration in the Medical Benefit Regulations governing the transfer of insurance practices was set up expressly to prevent buying and selling of insured persons. Nothing should be allowed to hinder the free choice provided by the Act, and the conditions set up by regulations should aim at making that choice as free as possible. Regulations for the transfer of insured persons have been frequently abused, and it is feared are still contravened. Transfer forms are freely signed by certain practitioners to facilitate the transference of insured persons from the lists of their neighbours on to their own. Unofficial forms are not unknown. For these reasons it is of great significance that the local medical committee should regard such conduct as prejudicial to the efficiency of the medical service. The restriction of free choice by agreements between practitioners and assistants is illustrated by the case of the Crossgates miners in West Fife. A doctor's assistant there had become so popular with the miners that when his chief found himself able to dispense with his services they insisted that he should stay on as their panel doctor. The miners declare that they are entitled to a doctor of their own choosing, and that any one who says them nay would be interfering with their rights.

Record Cards.

Request was made recently by a group of practitioners to the Ministry of Health that the obligation of keeping an accurate record of the number of attendances, visits, and certificates might be relaxed. It is, however, the number of attendances which gives some index of the volume of work done by panel practitioners for their insured patients, and the value that attaches to them is reflected in a decision of the London Panel Committee to get their members and certain practitioners outside the committee to keep accurate records of the total number of visits and attendances given to insured persons each day. Medical men who keep figures of all the work done day by day in their practices find them instructive and interesting, as well as likely to prove a useful weapon in the near future in meeting the criticisms of political economists.

Range of Medical Service.

Decisions recently made by the London Local Medical Committee, and accepted by the London Insurance Committee that certain services were outside the scope of medical benefit, include:—

(1) Preparation of an autogenous vaccine.
(2) Enucleation of tonsils.
(3) Examination of the blood for Wassermann reaction.
(4) Retinoscopy.

Service outside the scope of medical benefit can of course be rendered to insured persons, but before fees can be claimed for such services full particulars of the service must be given to the insurance committee within two days.

KING EDWARD'S HOSPITAL FUND FOR LONDON AND UNEMPLOYMENT.

THE Executive Committee of King Edward's Hospital Fund have brought to the notice of the Cabinet Committee on Unemployment the fact that at some of the London hospitals painting, repairs, and renewals are long overdue, having been deferred first because of the war and subsequently through shortage of funds. At other hospitals schemes for urgently needed improvement, also deferred, have been prepared; the plans and specifications are in many cases ready, and the work could therefore be speedily begun were the necessary funds available. In many cases part of the money is in hand, and could be used for the provision of immediate employment if it could be supplemented out of funds intended for the relief of unemployment. The Committee point out that this would be work of public utility to the borough in which the hospital is situated, to London as a whole, and to the country generally. Moreover, contributions towards this work would not only have the advantage of assisting the unemployed and the sick, but would also reduce the risk of the hospitals becoming a permanent charge on State or municipal funds. King Edward's Hospital Fund offer to communicate with the hospitals of London, and to prepare a schedule of the works which the hospitals would wish to submit for consideration. The question whether such work would be eligible for financial assistance from the Government is one for the decision of the Unemployment Grants Committee, within whose jurisdiction lies the distribution of monies voted by Parliament specifically for the relief of unemployment by the provision of such work. The Minister of Health trusts that this Committee to which the proposals are being sent will consider that the suggested schemes are eligible under the terms of the vote for financial assistance.

SCHOOL MEDICAL SERVICE.

Visual Defects in Schools.

THE reports of school medical officers, as summarised in our columns, testify to the value of the service that these officers render to the community. Taking the treatment of defective vision, for example, it is a striking fact that out of 1452 children for whom spectacles were prescribed in Bristol during the year, in only five cases did the children fail to obtain them. It is regrettable that the treatment of squint is not as satisfactory. Dr. A. Greenwood, in his report for the County of Kent, states that 2 per cent. of the school population suffer from squint, and this is probably an under-estimate. As soon as they attain school age, and are subject to school inspection, all that can be done is done, but in a considerable proportion of cases it is too late, for the squinting eye has already become more or less amblyopic. As Dr. Greenwood says, the seriousness of the condition is not realised, and there still exists no effective way of getting squinting children of less than school age under treatment. To take another subject dealt with in these reports, we wish that for statistical purposes the term "defective vision" could be defined. In Bristol, out of 18,603 who underwent routine examination, 4417 were found with "defective vision," but for only 1452 were glasses prescribed. In Kent the total cases of defective vision for the year were 571, of whom 349 required glasses. It is obvious that the standard adopted in Bristol must be very much higher than that obtaining in Kent. Again,

when we read that of cases of eye-strain 60 per cent. were due to hyperopia and 20 per cent. to hyperopic astigmatism, it would be of interest to have further light on the subject. What, for instance, is the proportion of hyperopia to the total power of accommodation which is considered sufficient to cause eye-strain, and what is the minimum amount of astigmatism in children which calls for correction? In relation to the prevention of eye-strain Dr. Greenwood devotes some space to the subject of school furniture and school lighting, and may minimise the importance of these factors. It may be true, as he says, that bad lighting in a school has not yet produced a case of eye disease. On the other hand, there can be no doubt that it has aggravated a large number, favouring as it does a spasm of the accommodation, over-convergence, and the faulty position of the head that is generally considered to favour myopia. The same is true of faulty school furniture which, as Dr. Greenwood himself points out, may cause some of the children to face the source of light, and is a notorious cause of the bad habit of stooping over lessons.

School Hygiene in the Transvaal.

Dr. C. F. Louis Leipoldt's report as medical inspector of schools in the Transvaal is not only of interest to doctors, teachers, and laymen alike, but is an outstanding addition to school hygiene and a valuable contribution to the literature on malaria. Having successfully tackled the problem of bilharzia during the last three years, Dr. Leipoldt now turns his attention to malaria, which is endemic over a large area of the Transvaal with severe annual local epidemics. The chronic malarious child is so debilitated that his output of work is diminished by 75 to 90 per cent., and his physical strength by two-fifths as compared with a normal child of the same age living in a non-malarious district. Such a child closely resembles the congenital syphilitic both as regards physical development and mentality. Although some of the children are naturally above the average mentality, constant attacks of malaria so increase their fatigue index that they are eventually quite incapable of concentration. Examination of such children by ordinary mental tests shows mental age 12 to 20 months below normal. This explains why the percentage of children responding to the normal mental tests for their age is so low in malarious schools.

Dr. Leipoldt quotes the case of a chronic malarious boy of 13 whose mental age, according to the modified Binet scale, was Standard II. After six months in the high veld his mental age was well up to and in parts above the normal.

"We are breeding," he says, "in malarious districts a generation of at least physical degenerates, burdened by the weight of prenatal malnutrition, and there is no evidence to show that we are even getting a vestige of racial immunity for it.

"The presence of carriers and mosquitoes being essential for the spread of the disease, the logical method of fighting malaria consists either in rendering the carrier harmless or in preventing the mosquito from biting healthy individuals, or in a combination of both methods. The problem of sterilising the carrier is a very difficult one. Its solution probably lies in some minimising serum which will prevent the development of gametes in the carrier, and therefore prevent the further development of the parasite in the salivary glands of the mosquito biting such a carrier. It may also be found, perhaps, in certain proteids or poisons that so debilitate the parasite in the blood-stream that it is unable to develop further. Such a poison is quinine."

Isolation of carriers being quite impracticable, Dr. Leipoldt says that only by careful and prolonged quinine treatment can we get rid of them. The one great argument against this proposition is the expense and futility of dealing with carriers in schools until there is a reasonable hope that such treatment will be supported by equally systematic treatment of native and other carriers outside, but he advocates quinine treatment both remedial and prophylactic in schools. All malarious children should receive regular doses of quinine weekly in the summer and proper tonic treatment during the winter. He lays stress on the fact that such quinine treatment must be regular, prolonged, and systematic. Judging by the success of Celli's experiments in the Panama and the Compagna area, Dr. Leipoldt is confident that the disease can to a large extent be controlled by methods of sanitation and mosquito destruction. Adequate screening and locality of teachers' houses and of hostels is insisted on, and detailed instructions for exterminating the mosquitoes are given. These three methods of attack on the disease must be combined, and for this purpose the coöperation of parents with teachers is necessary. Accordingly a series of lectures and talks to parents has been arranged. Model lessons for children and other practical educational propaganda have also been outlined. A modified curriculum suited to the special needs of malarious schools is also suggested, and a scheme has been drawn up for the establishment of a small home of recovery for these children. Dr. Leipoldt and his colleagues are to be congratulated on the thoroughly capable, comprehensive, and scientific manner in which they are tackling this problem which is of primary importance to the health of the school population in the Transvaal.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg.-Cmdr. E. T. Meagher, President for War Office Committee on Shell Shock, to be Surg.-Capt.

N. H. Smith to be Surg.-Lieut.

ROYAL ARMY MEDICAL CORPS.

Lt. (temp. Capt.) H. A. Hill to be Capt.

SPECIAL RESERVE OF OFFICERS.

Capt. R. MacKinnon to be Maj.

Capt. B. G. Derry relinquishes his commn. and retains the rank of Capt.

TERRITORIAL ARMY.

Capts. A. J. W. Stephen, R. Carswell, and G. Whitehead relinquish their commns. and retain their rank.

ROYAL AIR FORCE.

Awards and Promotions.

The King has approved of the following awards to officers of the Royal Air Force: Squadron Leader H. W. Scott to be Wing Cmdr.; Flight-Lieuts. R. E. Bell, G. S. Marshall, E. W. Craig, and R. A. G. Elliott to be Squadron Leaders; and Flight-Lieut. W. R. Kemp to be Honorary Squadron Leader.

J. W. Harper is granted a short service commission as Flight Lieut.

Capt. J. S. Smith, Army Dental Corps, is granted a temporary commission as a Flight Lieut. while attached for duty with the R.A.F.

INDIA AND THE INDIAN MEDICAL SERVICE.

The King has approved the admission of the undermentioned to the Indian Medical Service:—

H. H. Elliot and H. Williamson to be Capts., and H. Donovan and C. A. Kirton to be Lieuts.

The King has approved the grant of temp. rank as Lieuts. to Jagdish Sahai and Har Sarup Gupta.

The King has approved the retirement of Lt.-Col. A. G. McKendrick.

Major T. D. Murison has been appointed Assistant Director of Public Health on return from leave and has relieved Capt. H. S. Anand. Capt. R. V. Martin has been appointed Civil Surgeon, Ahmednagar, in addition to his military duties. Lt.-Col. C. C. Murison, Civil Surgeon, Belgaum, has been granted 20 months' combined leave. Major W. J. Simpson, Agency Surgeon, Gilgit has been granted leave. Lt.-Col. L. J. M. Deas has been posted as Agency Surgeon, Kotah and Jhaleswar. Capt. J. Galbraith Gill has been posted to the charge of the section hospital at Perambur Barracks and the Technical Recruiting Depôt, Madras. Capt. W. C. Thomas has been appointed to command of the Indian Station Hospital at Bellary. Capt. O. R. Linger has been posted as Second-in-Command of the Indian Station Hospital, Bangalore.

Correspondence.

"Audi alteram partem."

THE UNITY OF MEDICINE.

To the Editor of THE LANCET.

SIR,—The interesting leading article in your last issue on "1921" draws attention to a growing recognition of the unity of medicine, and at the same time to the scanty signs of constructive effort towards the attainment of that unity.

The causes of this inertia are worthy of inquiry. They are in part economic; the taxation, the cost of living, the expenses of practice are so high as to intensify the fight for existence and dull enthusiasm for the ideals of progress. Further, the financial sickness of the nation very properly forbids the expenditure of public money on new schemes. And so, very naturally, the medical man reflects, "Is it worth while doing anything?" I would like to put forward the contrary view that these lean years can be utilised to our great advantage. We can come to agreement as to the broad lines along which the organisation of medicine should proceed, and having clearly stated these principles we can insist that public policy is guided by them. If delay ensues in the enforcement of these principles we shall find, when time and circumstances compel us to bend our attention to them, that accomplished facts will be a barrier to their fulfilment.

Do we think, for example, that an increasing proportion of the medical men of Great Britain should be engaged in a whole-time salaried service? That is occurring now. Take the school medical service; a few years ago the number of whole-time medical officers was between two and three hundred; it is now 800. The tuberculosis officers are likewise swelling the ranks of a whole-time service. Is it not rather sound policy that these communal clinics should be staffed on a part-time basis by practitioners resident in the district, and as a corollary should not post-graduate instruction be provided in these subjects and ultimately be made a condition of eligibility for election? At Willesden there has recently been an unavowed effort to municipalise medicine in this important borough. Or, again, consider the problem of institutional provision—e.g., clinics, laboratories, various grades of hospitals. It is admitted that owing to the progress of knowledge such provision is increasingly necessary for efficient diagnosis and treatment, and yet its cost cannot be wholly met by the payments of individual patients. This problem concerns private patients as well as hospital patients. The solution is difficult, and especially if we keep in mind the importance of not allowing provision of equipment to interfere with the relationship between a patient and his medical attendant.

As a profession we shall be expected to be ready with answers to these and many other questions. If we are not ready, decisions will be taken without us. We cannot be ready with answers without having as a profession considered the problems. And here is our difficulty. We have no adequate means of collective expression. It is true the British Medical Association is a large, efficient, and public-spirited organisation, and is actually studying hospital policy; but there is no adequate coöperation between it and the academic, consulting, and specialist branches, which on their part have no cohesion amongst themselves. Some unifying force is needed if we are not to be sheep without a shepherd.

To return to the consideration of what is possible during these lean years. Coöperation with boards of guardians for the cautious utilisation of vacant Poor-law infirmary beds will not only help to meet the present needs of the population in some centres at small cost, but will enable us to gain experience in the problems of institutional provision, which will be of great value when the time for a forward movement shall arrive. Vacant Poor-law infirmary beds can be used to:—

1. Supplement or substitute the work of a voluntary hospital, teaching or non-teaching.
2. As a suitable home for communal clinics.
3. As wards for the treatment of paying patients provided there is no increased burden on the ratepayers, and the patients are left under the care of their own doctors.

Trials are being given here and there to each of these methods and can be usefully studied with a view to future developments. Anything which brings together the work of Poor-law infirmaries on the one hand, and the work of hospitals, health services, and general practice on the other hand, cannot fail to benefit both the public and the profession.

To this end doctors need to be brought into responsible association with the health activities of their districts. It is unsound that policy underlying maternity, infant welfare, tuberculosis, and other health matters should be determined without seeking the opinion and support of the local profession. A local medical council (with advisory not administrative functions), elected by postal vote from all the doctors of a district every four years, would be a valuable assistance to a medical officer of health, and its usefulness has been recently demonstrated at Bradford.

I am, Sir, yours faithfully,

Wimpole-street, W., Jan. 3rd. DAWSON OF PENN.

THE EDUCATION OF DEAF CHILDREN.

To the Editor of THE LANCET.

SIR,—I have read with much interest the letters which appeared in THE LANCET of Nov. 12th and 26th last on the development of hearing power in deaf children. The subject is of fundamental importance in the education of such children, and all experiments to find a means of restoring lost hearing, or increasing any which may happily be possessed, are deserving of most helpful encouragement. Mr. Macleod Yearsley, however, in his letter of the 26th, seems to suggest that the deaf child is being exploited, and at the present time teachers of the deaf are disturbed in mind by extravagant claims to cure deafness.

Are there any cases of functional deafness in schools for deaf children? Can hearing be developed in children who have never heard and have never given any indication that they have the power to hear? Can remnants of faint hearing power be improved to the extent of enabling the cases to receive their education entirely through the hitherto closed channel of instruction—the ear? As to cases of functional deafness in school children, who have been deaf since birth or very early childhood, there is no authentic record of any such child suddenly becoming possessed of a large degree of hearing power, and until reliable evidence can be produced that functional deafness exists in children and that the power to hear can be recovered it is dangerous to say anything which might interfere with the children's education by accredited teachers. Demonstrations with deaf children, with a view to find out whether functional deafness exists in school children, must be made with deaf children; if made with children who possess a fair remnant of hearing nothing is proved.

The acoustic training of deaf children with remnants of hearing has for many years been carried out in schools for the deaf, not only in this country, but also on the Continent and in America, and results prove that the children can be made to hear better; but the improvement which takes place is *mental*, not physical. The child learns to listen and to concentrate attention, and sounds which before were blurred, indefinite, and meaningless begin to take definite vowel form; words are discriminated and meaning is associated with them. Teachers of the deaf are alive to a real danger to the educational well-being of deaf children if they are subjected to experimentation without special knowledge of the psychology of the

deaf child or of the methods of educating him; they feel that such experimentation should be in collaboration with teachers. Children may be taken from school, their parents being imbued with the idea that their hearing is going to be restored. They may be told that the child has been instructed on entirely wrong lines, and a new method is going to be elaborated. Eventually they all return to the special schools, and occasionally one of them can hear a little better, but the majority are in no way improved. Precious months of their all-too-short educational life have been sacrificed to no useful purpose and the lost time can never be made up.

Now, suppose for the sake of argument that a child acquires a knowledge through the ear of 200 to 300 words and can answer a number of familiar questions and can respond to commonplace requests. What educational use is going to be made of this new power upon ordinary lines? Such a child can never be educated by aural means alone, and he must return to a special school for deaf children. It is a painful fact, only too well known to teachers of the deaf, but not appreciated by the layman, that even slight deafness in both ears has an extraordinary effect on the educational progress of a child, and necessitates a radical modification of the ordinary methods of school education. Lip-reading, as a means of communication, is a necessity, and only after lip-reading has been learned can the education be pushed on at anything like the normal rate of progress. What, then, of children whose deafness is gross?

The oral method of instructing deaf children cannot be dispensed with in the case of any child who has an appreciable degree of bilateral deafness. The "hard-of-hearing" find lip-reading of inestimable value, and it may even for them be described as a practical necessity. In my opinion, the ideal place for experiments with the hearing of deaf children is at the school attended by the child, and the experiments should be conducted in coöperation with the teacher. If the experiments are in the hands of a medical man, and at a clinic at a distance from the school, then an experienced teacher of the deaf, possessing an intimate knowledge of the psychology of the deaf child and of methods of educating him, should be associated with the doctor. To develop residual hearing, apart from the intrinsic value of any hearing power, exercises a wholesome effect upon the quality of the voice of the deaf child. Every child in my school with the slightest degree of hearing has regular "hearing" exercises at frequent intervals. But, as a general rule, it is only when there is a large degree of hearing, combined with an active intelligence and good memory, that there is any chance of the pupil being transferred to an ordinary hearing school and his education continued on oral and aural lines. And even the best of these transferred cases have to rely upon their lip-reading ability, and be given favourable positions in front of the class.

I should like to see readers of THE LANCET who have conducted experiments with deaf children, with a view to stimulating a dormant sense of hearing or to improving already existing hearing power, tabulating their results publicly. Parents and teachers could see to what extent real achievement has been reached. Respecting any particular series of experiments it is desirable to know (1) the number of cases the investigator has treated; (2) the length and nature of the treatment in each case; (3) the auditory, mental, and educational condition of each case when the experiment began; (4) the degree of progress made individually in the development of hearing acuity—physiologically considered, and apart from improvement in the power of mental interpretation; (5) the extent to which any increased acuity of hearing power has influenced subsequent educational methods and progress.

I am, Sir, yours faithfully,

G. SIBLEY HAYCOCK.

Oral School for Deaf Children, "Fitzroy House," 6, Kensington Park-gardens, W. 11.

WELSH NATIONAL SCHOOL OF MEDICINE.

To the Editor of THE LANCET.

SIR,—There is, we find, some confusion in the public mind as between the two appeals for university education purposes in Wales which appeared on Dec. 6th and 7th. May we explain that the two coördinate appeals were necessary and, indeed, inevitable, and were issued with the approval of the University and College authorities.

The Welsh National School of Medicine owes its inception and its present position to the foresight and energy of the governing body of the University College of South Wales and Monmouthshire and their friends. When, however, the new charter of the University of Wales was granted, it became necessary to give a national and university status to the school of medicine, although the administration remained in the hands of the Council of the University College of South Wales and Monmouthshire. Indeed, the Royal Commission recommended that the medical school should be a separate constituent college. When, therefore, funds were required, it was the business of the University Council, as controlling the finances of all the university colleges in Wales, to issue the appeal on behalf of the Welsh National School of Medicine.

The appeal of the University College of South Wales and Monmouthshire is entirely for its special and immediate needs, and is not in conflict with any other. The most urgent need of the College is for new laboratories in physics and chemistry, and these are as important for medical students as for students in pure science. Meanwhile, the need of the Welsh National School of Medicine for a fund of £100,000 (or its equivalent in annual income), before August, 1922, is very urgent in order that the school may qualify for the Treasury grant of £5000 per annum. That grant is absolutely dependent on the success of the appeal now made on behalf of the Welsh National School of Medicine, and contributions will be gladly acknowledged on behalf of the Appeal Committee by Mr. Gwilym Hughes, Organising Secretary, Welsh National School of Medicine, Newport-road, Cardiff.

We are, Sir, yours faithfully,

(Signed) KENYON, Pro-Chancellor.
A. H. TROW, Vice-Chancellor.

University of Wales, Dec. 28th, 1921.

IMPORTANCE OF THORACIC RESPIRATION.

To the Editor of THE LANCET.

SIR,—I have read with great interest Sir Arbuthnot Lane's article in your issue of Dec. 24th, 1921, on the importance of thoracic respiration, for the reason that it refers to points, raised in an article in *National Health* (June, 1919), where I showed how much thoracic respiration was dependent on efficient nutrition, by which I meant the proper supply of nourishment and the bestowal of great care and attention on the functioning of the intestinal canal. My experience of the importance of the free and indeed forcible passage of air through the naso-pharynx as the chief if not the only factor in the development of this cavity and of its thorough ventilation, coincides entirely with the views on the mechanics of the naso-pharynx and of the bones of the face which Sir Arbuthnot Lane has described in detail in many papers on this subject.

I am quite satisfied that the infection of the lymphatic tissue of the naso-pharynx by organisms can be avoided by suitable breathing exercises, and I also believe that a certain proportion of adenoid hypertrophy can be removed by improving the vitality of the tissues generally by proper food, efficient intestinal drainage, and increased oxygenation of the blood in the manner indicated. After, and usually before I deal surgically with infections of the adenoids, I employ these methods of treatment to remove any residual infection and to prevent recurrence. It is important for those who operate for the removal of adenoids to realise that the

infection of this lymphatic tissue of the naso-pharynx is only one manifestation of a general loss of vitality due to defective nutrition.

I am, Sir, yours faithfully,

PHILIP FRANKLIN, F.R.C.S.

Wimpole-street, Cavendish-square, W., Jan. 2nd, 1922.

WHAT IS THE TOXIN?

To the Editor of THE LANCET.

SIR,—The article which appeared in your issue of Dec. 24th, 1921, from the pen of Sir Arbuthnot Lane, dealing with the subject of respiration, raises issues which are of great interest to the biochemist and bacteriologist. Reference is made to some powerful toxin which depresses the muscles and so impairs the movements of the thorax. One would like to know what the nature of this substance is, where it comes from, and how it acts. Does it affect the muscle fibres themselves or their associated nerves? Is its site of action peripheral or in the central nervous system? The common occurrence of stasis in the intestines and of putrefactive products in the urine of the patients under discussion leaves little room for doubt that the alimentary tract is the source from which the poison comes. It may arise, like the amines and ptomaines, from the decomposition of food by the bacteria of the bowel, or it may be a true bacterial toxin synthesised by the micro-organisms from the chyme. The asthenia of the muscles closely resembles that which occurs in a more acute form in enteric fever, when the small intestine is infected by *B. typhosus*. This analogy suggests a solution of the mystery surrounding the toxin which we seek. When stasis persistently recurs in the ileum bacteria ascend from the cæcum into the small intestine. So far as the saprophytes are concerned, the density of this invasion is in a general way proportional to the severity of the stasis. The higher the pollution spreads the greater is the putrefaction which results. Soluble organic poisons are readily absorbed through the mucosa of this part of the bowel. It would seem very natural that toxins arising in this way from an infection of the ileum with *B. coli* should be similar in many respects to those absorbed when the same region is infected with *B. typhosus*, which belongs to the same group of bacteria. Future research will determine the precise chemical nature of the poisonous substance concerned, and in the meanwhile this explanation furnishes a working hypothesis of where and how it is produced.

I am, Sir, yours faithfully,

Cavendish-square, W., Jan. 2nd, 1922. N. MUTCH.

THE TREATMENT OF TONSILS AND ADENOIDS.

To the Editor of THE LANCET.

SIR,—According to a recent leading article in THE LANCET (Dec. 17th, 1921) a Council has been formed apparently to combat the opinions and deeds of those who are in the habit of operating on cases of nasal obstruction, and from the information given in this article it would appear that the necessity for the removal of tonsils and adenoids is principally in question. To one who is in the habit of removing tonsils and adenoids it would seem obvious that if the presence of these growths is causing symptoms of sufficient gravity to warrant operative interference, they should be removed. The symptoms that are undoubtedly due to this condition, leaving out the more debatable ones of epilepsy, asthma, rickets, &c., are the following: (1) Mouth-breathing; (2) catarrhal otitis media; (3) recurrent attacks of suppurative otitis media; (4) chronic suppurative otitis media; (5) palatal deformity and prominent incisor teeth; (6) recurrent sore-throats; (7) cervical adenitis. It cannot be denied that these symptoms are due in practically all cases to the presence of enlarged and diseased tonsils and adenoids. In the last decade many discussions have taken place and many articles have been written on the necessity for enucleating tonsils, and a great many methods of enucleation have been described. These discussions and articles have satisfactorily disposed of the tonsils, but the question of adenoids has, to a great extent, been allowed to drop into the background, and adenoids are of equal, if not of greater, importance in the production of adverse symptoms. Tonsils should be removed when they cause symptoms, and it is my practice to remove them, even if they are not a source of great trouble themselves, provided the symptoms caused by the adenoids are sufficient to justify operation. It is less trouble to the operator and more satisfactory to the patient's friends to have them removed at the same time rather than at a later period, for as Dr. Merrall has stated[1] there is a definite tendency for tonsils to hypertrophy after operation on the adenoids alone.

Now let us take the main symptoms enumerated above in order.

(1) *Mouth-Breathing.*—It cannot be denied that adenoids cause this symptom by mechanical obstruction, and provided that there is no other cause of nasal obstruction—e.g., deflected nasal septum, &c.—removal of the adenoids must relieve this condition. Besides their mechanical effect adenoids, of course, produce nasal obstruction in other ways, by causing post-nasal catarrh and giving rise to hypertrophy of the inferior turbinates, especially the posterior ends. There is no doubt that many children with adenoids can breathe through their noses if they will make an effort, but it is a conscious effort: the child finds that it can breathe more easily with its mouth open, and consequently does so. If the cause is not removed the habit becomes permanent, and all the defects associated with this condition are liable to follow with serious results.

(2) *Catarrhal Otitis Media.*—This is a very common symptom of enlarged tonsils and adenoids; the infection takes place from the naso-pharynx via the Eustachian tube. The condition usually starts as an acute catarrh with an exudate of mucus into the middle ear, recurring at intervals, especially when the child is suffering from a nasal cold. If the adenoids are not removed the condition is apt to become chronic, and resulting in a certain degree of permanent deafness, and a tendency towards extreme deafness in later life. It is a matter of everyday experience that the majority of these cases are completely cured by operation, provided it is undertaken before the catarrh has had time to assume a chronic nature.

(3) *Recurrent Acute Suppurative Otitis Media.*—All the remarks made above apply equally to this condition, with the added risk of a chronic suppuration which may lead to a mastoiditis or even an intracranial complication.

(4) *Chronic Suppurative Otitis Media.*—I think it is recognised by most medical men that if tonsils and adenoids are present, their removal is the first step in the treatment of this condition in children, and a surprising number of cases dry up and heal after this has been done, even if they have hitherto resisted all forms of local treatment.

(5) *Palatal Deformity and Prominent Incisor Teeth.*—The results of operation on this symptom are the least satisfactory of any, because the children are for the most part older, and the bony structure has become more permanently affected before much notice is taken of it. Several cases which have resisted the dental surgeon's treatment have been referred to me for operation, and in all of them an improvement and a readier response to treatment has been noticed afterwards. If these cases are left alone in the hope that the child will grow out of it the results are often very distressing, the high arched palate and prominent incisors amounting to an absolute disfigurement; the appearance of many an otherwise good-looking child is quite spoilt by this condition.

(6) *Recurrent Sore-Throats.*—Nearly all the sore-throats of children are due to tonsillitis, and if the tonsils are enucleated the condition obviously cannot

[1] THE LANCET, 1921, ii., 994.

recur. Tonsils once properly removed do not grow again, any more than an appendix.

(7) *Cervical Adenitis.*—In the great majority of cases enlargement of the cervical glands is due to septic infection from the tonsil. No doubt a great many patients acquire a secondary tuberculous infection, which accounts for those cases in which the glands do not subside after tonsillectomy. Many cervical glands entirely disappear after operation, and many are improved, but there is no doubt that quite a definite percentage remain unaltered.

In conclusion, every throat surgeon will have noticed the enormous improvement in the general health of children after this operation—an improvement confirmed in nearly all cases by the statements of parents and medical advisers. I consider that spontaneous disappearance of symptoms does not occur if the symptoms have been of any magnitude. No doubt many children have a slight trace of adenoid tissue which gives rise to no trouble and which will disappear in time without doing any harm. In a hospital where the out-patient department greatly exceeds the in-patient accommodation children have to wait much longer than is desirable for the operation, and one rarely sees a case that does not need operation when its turn arrives, however long it has been waiting. I do not think I have overstated the case in favour of operation, and the benefits conferred by it are in such contrast to the harm done by withholding it, that I shall never hesitate to advise it in cases where, in my opinion, it is necessary, at least until it is definitely proved that the same result can be obtained with the same certainty by other means. It will be interesting to see what evidence is produced by the Council and what methods of treatment are suggested as an alternative to operation.

I am, Sir, yours faithfully,

F. G. WRIGLEY, M.D.,
Hon. Surgeon, the Manchester Ear Hospital; Aural Surgeon, the Royal Deaf Schools,
Dec. 21st, 1921. Old Trafford, Manchester.

THE ÆTIOLOGY OF ADENOIDS.

To the Editor of THE LANCET.

SIR,—Your leading article on adenoids in THE LANCET of Dec. 17th, 1921, calls attention to my paper of Nov. 12th. In reference to the controversial opinions therein indicated I should like to state:—

1. That enlargement of the palatine tonsils has always been secondary to enlargement of the pharyngeal tonsil in the cases I have noticed of recent years—i.e., since my attention was roused to this sequence. The reverse, however, does not hold good. It is safe to assume affection of the pharyngeal tonsil in cases where the palatine tonsils are enlarged, but it cannot be argued that if the palatine tonsils are not enlarged therefore there are no adenoids. If my suggestion is correct that the pharyngeal tonsil is the first to provide the means of defence against the organisms which cause catarrh as well as against those which cause the various exanthemata, to say nothing of its possible action in providing the means of sterilisation of the inspired air, then it naturally follows that it will be the first to be overworked, and that the other members of the inner of Waldeyer's ring of lymphatic glands will be affected secondarily. Cervical adenitis, itself so common a symptom of adenoids, only means that the members of the outer of these rings, these first lines of defence, have been brought into action and have been overworked. But this is by no means an original observation. In that wonderful example of what a scientific text-book should be, by Sir StClair Thomson,[1] there occurs:—

"The pharyngeal tonsil shares in all catarrhal attacks of the nose and throat, and any hypertrophy shows a marked increase after such auto-infections as measles, scarlatina, diphtheria, and whooping-cough. The discovery of the presence of enlargement of the palatine tonsils always indicates the presence of some lymphoid thickening in the naso-pharynx. The contrary does not hold good—i.e., a large mass of adenoids may exist without any marked palatine tonsils."

2. Adenoids are attended by leucocytosis and anæmia. The hæmoglobin and alkalinity of the blood are less than normal. Given anæmia, there is less energy. Habits of lounging and standing with the weight mainly on one leg follow, and I think this is the cause of the flat-foot I so generally find in children suffering from this affection.

3. As for the curing of epilepsy, chorea, and nocturnal enuresis by operation. Epilepsy is a rare result of adenoids. I hope I am not taken to mean that epilepsy can ordinarily be cured by curetting the naso-pharynx. But I have known two bad cases of epilepsy respecting which I came to the conclusion that there was a possibility that irritation originating in the naso-pharynx might have something to do with the recurrence of the convulsions, and where operation was in each case followed by a complete cure. Chorea and nocturnal enuresis may result from the blood changes, and to quote Sir StClair Thomson again: "The blood condition has always improved after operation."

Much, however, depends on the nature of the operation performed. I have a shrewd suspicion that many recurrencies of adenoids are due, firstly, to the operation not being properly completed. And this is likely to be the case when there is a difficulty with the respiration, a difficulty which I guard against by making sure that the coughing reflex is in active operation from start to finish; and secondly, to no steps being taken by the surgeon in the way of instructions to the patient and relatives with the object of curing the habit of mouth-breathing after the completion of the operation for removal of the adenoids. I am, Sir, yours faithfully,

Manchester, Dec. 17th, 1921. HARRY MERRALL.

[1] Diseases of the Nose and Throat, second edition, p. 319.

To the Editor of THE LANCET.

SIR,—Dr. Sim Wallace, usually so illuminating, gives me no help in his recent letter; nor does Dr. Merrall. My conclusion that faulty dietetic customs are preponderatingly responsible for "adenoids" follows logically from my data, and the only way to shatter that conclusion is successfully to attack my data. This neither of these gentlemen has done. To adopt any other method of argument is merely to obscure by words what is a perfectly clear issue—the greatest danger in controversy.

Let us, then, end this controversy on the ætiology of adenoids and face the logical conclusion that it is largely, at least, dietetic in origin. Of nothing am I more assured than that by feeding our children on sane lines we shall confer an immense boon on our race, and very greatly diminish the incidence of adenoids, enlarged tonsils, diseased teeth, and numerous other evils. I write as one who has given this subject constant thought for a quarter of a century. I am, Sir, yours faithfully,

HARRY CAMPBELL.

Wimpole-street, W., Dec. 24th, 1921.

LÆVULOSE AS A TEST FOR HEPATIC INEFFICIENCY.

To the Editor of THE LANCET.

SIR,—Although we are not disposed to criticise those parts of the paper by Dr. J. C. Spence and Dr. P. C. Brett[1] directly bearing on the title, as they confirm our observations on dogs,[2] we cannot let their remarks upon our other work pass unanswered. In the first place, our paper was entitled Some Factors Controlling the Normal Sugar Content of the Blood, since we did not wish to imply that there were no other influences at work, as there undoubtedly are. One, which we purposely did not discuss as the data available were not sufficiently definite for a decided opinion either

[1] THE LANCET, 1921, ii., 1362.
[2] THE LANCET, 1921, i., 1017.

way, was whether the entrance of sugar as such into the circulation might not raise the sugar content of the blood. In spite of the experiment quoted by these authors on the effects of introducing dextrose into the stomach and the jejunum, we are no nearer a solution of the problem, for it is quite conceivable that the more rapid increase and higher percentage attained when the sugar was given by Einhorn's tube than by the mouth may be explained by an alteration in the "fixed acid" to base equilibrium of the blood brought about by the associated intestinal secretion. If their view, that the increased blood-sugar is due to the dextrose passing "through the liver to circulate for half an hour or more in the systemic circulation" were correct, we should expect that varying doses of sugar would give different percentage in the blood, but Berghard and Cushing have shown this is not the case, 30 g. and 200 g. giving the same rise and only differing in the rate at which their effects pass off.

Drs. Spence and Brett quote us as stating that an actual change in the hydrogen-ion concentration of the blood occurs during digestion; that, of course, was not our intention; what we wished to say was that there is a change in the relation of fixed acids to bases, which is compensated by carbon dioxide elimination or retention, as we pointed out in a subsequent communication.[3]

With regard to their experiments upon the effects of food upon the sugar content of the blood in normal persons, they raise the question as to what is a normal person. Judging from the scanty data they furnish, we should expect that the subject of their experiments suffered from hyperchlorhydria, for an "immediate rise," which was "greatest in the first half hour or so and reaches its maximum within 60 minutes," is very suggestive of that condition. It was only after considerable experience with animals, and when we had made a large number of experiments with human beings, that we came to the conclusion that a perfectly healthy man, like a normal dog or rabbit, reaches his maximum at the second, or, occasionally, at the third hour, after a meal taken in the morning subsequent to a 12 hours' fast.

We are, Sir, yours faithfully,

P. J. CAMMIDGE,
J. A. CAIRNS FORSYTH,
H. A. H. HOWARD.

Nottingham-place, W., Jan. 2nd.

STANDARDISATION OF CELL EMULSION IN WASSERMANN TEST.

To the Editor of THE LANCET.

SIR,—I was under the impression that all careful serologists had for some time realised the necessity for accurate standardisation of the red cell emulsion used in the Wassermann test, and I hope that the exact study by Dr. J. W. Bigger on this point, appearing in your issue of Dec. 31st last, will convince any who have not already made the discovery for themselves. Two years ago I worked out the relationship between cell concentration and complement activity, and found, like Dr. Bigger, that with emulsions ranging in cell content from 3 per cent. to 6 per cent. the activity of any given sample of complement forms a linear function of the cell dilution. Since that time I have made a practice of standardising the cell emulsion by means of the Sahli colorimetric method. This I find even simpler and easier than the Haldane procedure, and the method can be utilised, if necessary, by artificial light, needs no gas for its accomplishment, and only occupies a very few minutes.

Taking the "5 per cent." cell emulsion as prepared by my laboratory attendant, 200 c.mm. are mixed with N/10 hydrochloric acid in the Sahli hæmoglobinometer to ascertain the actual hæmoglobin (as hæmatin) in the emulsion; the strength of the latter is then adjusted as needed, so that 200 c.mm., when diluted in the Sahli tube to equality with the standard, reach the 80 mark. This is equivalent to 1·4 g. hæmoglobin per 100 c.cm. of emulsion, and with average sheep's blood cells represents a true 5 per cent. emulsion of cells. This is, I believe, the optimum concentration for use in Harrison's technique, which in improved form I follow. Apart from the matter of convenience, I believe it is not less sound practice to base the strength of the cell emulsion upon the hæmoglobin content rather than upon cell counts or upon the method advocated by F. C. Lewis in 1920.

By following a technique of exact standardisation of cell emulsion on these or equivalent lines, the accuracy and consistency of Wassermann tests week by week is very definitely enhanced.

I am, Sir, yours faithfully,

A. F. SLADDEN,
Swansea, Jan. 2nd, 1922. Director of Beck Laboratory.

[3] Brit. Med. Jour., 1921, ii., 618.

MAURITIUS.

To the Editor of THE LANCET.

SIR,—I read with interest the account in THE LANCET of Dec. 31st last of the lantern demonstration I recently delivered before the Royal Society of Tropical Medicine and Hygiene. May I, however, point out that the method of introduction of *A. costalis* there mentioned, though probable, must still be regarded as hypothetical, as there is no absolutely definite proof that it occurred, and, further, it is believed that the mosquito found its way ashore, not at Port Louis, but at Petite Rivière Bay, in the Black River District. Again, the real reason that streams shaded by trees are free from the larva of *A. costalis* is that the green water weed on which the larva feeds cannot develop without sunlight.

The letter from Dr. C. L. D'Avoine on infectious disease in Mauritius in the same issue is interesting, and, in the main, correct. The conditions in most of the sugar estate camps are very unsatisfactory, and this is one reason why ankylostomiasis is so prevalent in the island. At the same time insanitary conditions are by no means limited to the coolie class, because the poor creoles and the Chinese as a rule have very insanitary surroundings. Dr. D'Avoine is wrong in saying that Port Louis has a good water-supply. A few places in Port Louis have a good water-supply derived from the Mare Vacoas Reservoir, and the excellent filter-beds at La Marie, but the greater part of Port Louis is supplied by unfiltered and polluted water from the Grand River, N.W., and portions of the suburbs of the town still draw a highly insanitary supply from the Dayot and Bathurst Canals.

I am, Sir, yours faithfully,

ANDREW BALFOUR.

Wellcome Bureau of Scientific Research,
Endsleigh-gardens, N.W., Jan. 3rd, 1922.

PRESENTATION TO DR. JOHN MCVAIL.—The retirement from the Scottish Board of Health of Dr. John McVail has been marked by a farewell presentation from his colleagues on the Board and members of the staff. Sir George McCrae, in making the presentation, referred to Dr. McVail's long and varied experience in the medical profession, first as a private practitioner, then as medical officer of health for the counties of Stirling and Dumbarton, thereafter as one of the Scottish National Health Insurance Commissioners, and latterly as one of the members of the Scottish Board of Health. In each of these capacities Dr. McVail had displayed exceptional abilities in discharging the difficult and onerous duties falling upon him. He had made a number of valuable contributions to medical literature, particularly on matters relating to public health, and had been specially selected on several occasions to undertake inquiries on behalf of Government Departments and Commissions. As one of the Insurance Commissioners he had taken a leading part in the introduction and carrying into operation of the Health Insurance Act of 1911. Sir James Leishman spoke of the zeal and enthusiasm with which he had carried out the difficult duties connected with the introduction of the National Insurance scheme. Sir Leslie Mackenzie, Mr. J. Jeffrey, Dr. J. R. Currie, and Mr. Peck also spoke. In reply, Dr. McVail referred to the changes that had taken place in medical science and practice since he first qualified, and particularly in regard to public health administration.

Obituary.

SIR GERMAN SIMS WOODHEAD, K.B.E., HON. LL.D. TORONTO AND BIRM., M.A. CAMB. (HON. CAUSÂ), M.D., C.M. EDIN., F.R.C.P. EDIN.,

PROFESSOR OF PATHOLOGY IN THE UNIVERSITY OF CAMBRIDGE.

Sir German Sims Woodhead died on Dec. 29th last at Arsthorpe Hall, Lincolnshire, where he and Lady Woodhead had been staying with friends. He had been in failing health for some time, but the end was sudden.

Born on April 29th, 1855, he was the eldest son of Joseph Woodhead, the editor of the *Huddersfield Examiner* and formerly M.P. for the Spen Valley Division of Yorkshire, and Catherine, eldest daughter of James Booth Woodhead, of Holmfirth. He received his general education at the local school of Huddersfield and proceeded to Edinburgh University, where he graduated M.B., C.M. in 1878. He was a popular and successful student, and represented his university on the racing track and in the Rugby fifteen, later on winning his international cap. In the year in which he graduated he became President of the Royal Medical Society of Edinburgh, a post held at the beginning of their careers by many eminent Scotsmen. He took the M.D. in 1881, obtaining the gold medal for his thesis, and was elected F.R.C.P. Edin. in 1882. He further pursued his medical studies in London, Berlin, and Vienna, and returning to Edinburgh became demonstrator of anatomy and physiology in one of the extra-mural schools until his election as demonstrator of pathology in the University. Here he came into close association with William Rutherford, the famous Edinburgh physiologist, whose lectures largely influenced Woodhead's early work on practical pathology. From 1887 to 1890 Woodhead was superintendent of the laboratory of the Royal College of Physicians of Edinburgh, during which time he produced a book on pathological mycology in collaboration with Dr. A. W. Hare, and in 1890 he was appointed Director of the laboratories of the Conjoint Board of the Royal Colleges of Physicians of London and Surgeons of England.

At this time Woodhead entered into close association with THE LANCET, whose special correspondent in Edinburgh he had been for some time. He superintended the bacteriological research necessary in connexion with any of the investigations being made in THE LANCET Laboratory and was responsible for several analytical and sanitary inquiries, notably one made into the incandescent system of gas lighting and another into the flash-point of oils for use in lamps. Of the various inquiries of this character which Woodhead made, usually in connexion with the late Mr. Vasey, the Director of THE LANCET Laboratory, one on the standardisation of disinfectants proved the most widely valuable. This was a large and sound piece of research, and Woodhead and Vasey made an admirable combination in its performance. In 1899 Woodhead's close connexion with THE LANCET ceased on his appointment as professor of pathology in the University of Cambridge in succession to the late Prof. Kanthack, but he continued to assist us by frequently reviewing pathological books and journals, and especially by watching the growth of all international movements for the prevention and cure of tuberculosis. On this last subject he was also frequently a signed contributor, having all the necessary equipment at his fingers' ends after acting as assistant commissioner to the Royal Commission on Tuberculosis, 1892–1895. Latterly he became keenly interested in the experiment of colony treatment for tuberculosis being carried out at Papworth.

During Woodhead's long tenure of the chair of pathology at Cambridge he saw an enormous development in the size of the medical school and the construction of the commodious existing laboratories, in the building of which he took an active supervising part. A careful and exceedingly kind teacher and an ingenious and indefatigable worker, he had conducted little original research work in the years immediately preceding the war. At the outbreak of hostilities Woodhead was approaching his sixtieth year and was already in delicate health, but he immediately threw all his energies into discharging special duties for which he was well equipped. He was an enthusiastic officer of the old Volunteer Medical Service and had already received the Volunteer Decoration. He was appointed advisor in pathology to the War Office with the brevet rank of colonel, and later, after special work in the Irish Command, became inspector of laboratories in military hospitals in the United Kingdom. In the course of arduous duties he was twice mentioned in despatches for special service, and in 1919 received the K.B.E. in special recognition of his researches into the chlorination of water for the supply of troops.

This is a brief record of a long and busy life devoted to the practical applications of physiology and pathology, and his activities brought him into connexion with many public bodies and earned him many degrees. He was a Fellow of the Henry Phipps Institute, Philadelphia, of Trinity Hall, Cambridge, of the Royal Society of Edinburgh, and also the Institute of Sanitary Engineers. The University of Cambridge gave him an honorary M.A., those of Toronto and Birmingham an LL.D. He had been at different times President of the Royal Microscopical Society and the Physical Society of Edinburgh. He was a member of the Executive Committee of the Imperial Cancer Research Fund, the author of a valuable report to a Royal Commission on Tuberculosis, and to the Metropolitan Asylums Board on Diphtheria, and for some time was editor of the *Journal of Pathology and Bacteriology*. Lastly, he was an ardent advocate of the temperance cause, and was President alike of the British Medical Temperance Association and the British Temperance League.

Sir German Sims Woodhead married in 1881 Harriett Elizabeth St. Clair Erskine, second daughter of James Yates, of Edinburgh, but there was no issue of the marriage.

REGINALD ANSTRUTHER FARRAR, M.A., M.D. OXF., D.P.H. CAMB.

Dr. Reginald Farrar died of typhus on Dec. 29th at the German Hospital in Moscow whither he had gone to assist Dr. Nansen in organising arrangements for famine relief.

Son of Dean Farrar and born in 1861, Reginald Farrar was educated at Marlborough and Oxford, taking his medical course at St. Bartholomew's Hospital, where he was house surgeon to Sir William Savory. But clinical medicine was never congenial to him, and after a brief period in general practice at Stamford in Lincolnshire he abandoned private practice for the wider field of public health and sociology. In 1899–1900 he went out to do special plague duty in India and had his first experience of famine and pestilence. Three years later he was appointed a medical inspector of the Local Government Board; there and at the Ministry of Health he studied social problems in their relation to public health, and his reports on the lodging and accommodation of navvies, hop-pickers, pea-pickers and fruit-pickers (1906–08) show the intimate knowledge which he acquired of many classes of workers. In 1911 he acted as British representative on the International Plague Commission in Manchuria, and instituted inquiries in China and Siberia respecting pork and bacon exported to England. In 1914 he was actively engaged in the examination of refugees in Belgium and he only left Ostend when the German army entered the town; in recognition of these services he received the Belgian Order of Chevalier de la Couronne. In 1915–16 he served as specialist sanitary officer at Malta with temporary rank as Major R.A.M.C. Later he was transferred to the Colonial Office and undertook the duties of health officer at Freetown, Sierra Leone.

In 1920 he visited Austria and Hungary to make arrangements for the reception in England of starving children from these countries. He retired last July from his appointment at the Ministry of Health.

Regarding the final piece of work at which Dr. Farrar met his death, we have received an account from his friend, Dr. F. Norman White, chief commissioner to the Epidemic Commission of the League of Nations. Dr. White writes:—

It was only during the last few months that I had the privilege of being brought into close contact with Reginald Farrar, when I was associated with him in arranging his last great enterprise. Less than three months ago Dr. Nansen requested the Epidemic Commission of the League of Nations to assist him in the management of the public health side of his famine relief organisation. It was arranged that a representative of the Commission should proceed to Russia, where he would be under the orders of Dr. Nansen. The Epidemic Commission considered themselves fortunate indeed when Dr. Farrar very readily consented to act as their representative in Russia. Farrar accompanied me to Geneva at the beginning of November, where we met Dr. Nansen, with whom he travelled to Moscow. After a brief stay in Moscow, Nansen and Farrar made a tour through the famine districts. It was on this tour that Farrar became infected with the disease from which he died.

Farrar's letters written from the famine area tell of appalling destitution, disease, misery, and want, which impressed him painfully, but between the lines of these letters one can read of the happiness which filled him at the opportunity afforded of doing something to improve the lot of some of the sufferers. The last letter received from him was dated Dec. 19th; in this letter he stated that he was suffering from fever of an unknown nature. He realised the possibility of its being typhus fever. He forwarded a rough draft of a memorandum he was preparing for the use of workers in the famine area instructing them how they might lessen the risk of infection of the more important diseases prevailing there.

Farrar possessed unbounded enthusiasm and energy. When one was with him it appeared incredible that he had reached the age of 60. Full of love for mankind, and sympathy with human suffering and distress, the opportunities afforded by the last task to which he set his hand filled him with happiness. He recognised the dangers which confronted him—we discussed them fully—but they weighed as nothing with him. Such an attitude appears to have been characteristic of his whole life. He gave one the impression of being a singularly happy man.

Dr. Farrar was buried in Moscow in the "Cemetery for Foreign Faiths." Of his two sons, one was killed in action during the war, the other was seriously wounded and received the Military Cross.

GEORGE MAITLAND EDMOND, M.A., M.D., C.M. ABERD.

THE death of Dr. G. M. Edmond took place suddenly at his residence in Aberdeen on Dec. 18th. Dr. Edmond, who was the son of the late Mr. John E. Edmond, Aberdeen, was educated at Dr. Tulloch's Academy and the Aberdeen Grammar School, where he was the holder of the gold medal for the best all-round scholar in the highest class.

He entered the University of Aberdeen in 1868 as seventeenth bursar, and after a distinguished University career, graduating M.A. in 1872, and M.B., C.M. in 1875, with highest honours in medicine and surgery, and M.D. in 1877.

Dr. Edmond was in general practice in Stonehaven for nine years, being surgeon to Stonehaven prison, and came to Aberdeen in 1884, since when he held a number of important appointments. He was appointed physician to the General Dispensary in 1886, and was an examiner in the practice of medicine and pathology at the University, assistant to the professor of midwifery, physician to the Hospital for Incurables, examiner in surgery and midwifery, anæsthetist to the Royal Infirmary, senior physician and lecturer on clinical medicine at the Royal Infirmary, and medical officer to the Aberdeen Post Office. He was also a surgeon-captain in the 1st V.B.G.H. In late years Dr. Edmond had given up many of his former activities, though he remained in practice until the last. He is survived by his widow, and by a son and daughter.

Medical News.

UNIVERSITY OF OXFORD.—The following candidates passed in the recent examinations in the subjects indicated:—

Medicine, Surgery, and Midwifery.—C. C. H. Chavasse, B.A., Hertford Coll.; G. Cranstoun, B.A., Oriel Coll.; C. H. Laver, University Coll.; D. B. Pauw, B.A., Trinity Coll.; M. E. Shaw, B.A., New Coll.; W. S. Tunbridge, B.A., Lincoln Coll.

Pathology.—W. R. Brain, B.A., New Coll.; E. F. Chapman, B.A., Magdalen Coll.; R. van B. Emmons, B.A., New Coll.; H. A. Gilkes, Christ Church; E. H. Koerner, Magdalen Coll.; C. R. Lane, Pembroke Coll.; W. J. E. Lupton, B.A., New Coll.; J. D. Mills, Lincoln Coll.; C. R. Young, University Coll.; Dorothy W. Crook, B.A., Somerville Coll.; Constance M. Ottley, B.A., Society of Home Students.

Forensic Medicine and Public Health.—C. W. C. Bain, B.A., Christ Church; P. W. Boobbyer, B.A., Keble Coll.; W. Champneys, Oriel Coll.; J. L. Cox, Brasenose Coll.; G. Cranstoun, B.A., Oriel Coll.; S. Hartley and H. C. Hill, Hertford Coll., H. P. Hodge, B.A., non-collegiate; C. H. Laver, University Coll.; D. G. Leys, Balliol Coll.; H. D. Pavière, Christ Church; W. A. Young, B.A., Jesus Coll.

Materia Medica and Pharmacology.—P. W. Boobbyer, B.A., Keble Coll.; W. R. Brain, B.A., New Coll.; A. M. Cooke, B.A., Jesus Coll.; A. D. Dyson, B.A., Corpus Christi Coll.; J. A. Macfadyean, Brasenose Coll.; J. P. Shaw, Balliol Coll.; G. F. Skinner, Exeter Coll.; A. L. B. Stevens, B.A., Christ Church; E. B. Strauss, B.A., New Coll.; Sibyl R. J. Eastwood, B.A., Society of Home Students; Nancy B. Ockenden, B.A., Jean Orr-Ewing, B.A., Lady Margaret Hall.

UNIVERSITY OF CAMBRIDGE: DIPLOMA IN MEDICAL RADIOLOGY AND ELECTROLOGY.—The following candidates have recently passed in Part I. (Physics and Electrotechnics):—

Frederick Thomas Burkitt (Christ's), Robert Westland Chalmers, Jinebhai Lallorbhai Desai, Robert Augustin Gardner, James Dunlop Kidd, John Sutherland Levack, Margaret Clare Murphy, Walter Key Parbury, Lionel Glover Pearson, Jyoti Lal Sen, and John Sutton Webster.

The following candidates passed in Part II. (Radiology and Electrology):—

Jinebhai Lallorbhai Desai, Purshottam Mulchand Desai, Robert Augustin Gardner, Alexis Cornelis Willem Lionarons, and Lionel Glover Pearson.

UNIVERSITY OF ST. ANDREWS.—In the Fourth Professional Examination for Degrees of M.B., Ch.B. the following have passed in the subjects indicated:—

Medicine.—Thomas King Buchanan, George R. M. Cordiner, and Katharine Duff Macfarlane.

Surgery.—Thomas King Buchanan, George R. M. Cordiner, Nona S. Lesslie, J. N. D. Smith, and Margaret H. R. Young.

Midwifery.—George Gilbert Buchanan, Thomas King Buchanan, Katharine Macgregor Campbell, Harry Fisher, Phyllis Fleming, and Gracie Macgregor McRorie.

UNIVERSITY OF LONDON.—A course of three lectures, entitled Orientation and Conjugation in Organic Chemistry from the standpoint of the Theories of Partial Valency and of Latent Polarity of Atoms, will be given by Prof. Robert Robinson, F.R.S., at King's College, on Fridays, Jan. 20th, Feb. 17th, and March 17th, at 5 P.M. Admission free without ticket. A course of ten lectures on the Structure of the Atmosphere and the Meteorology of the Globe will be given at the Meteorological Office, South Kensington, by Sir Napier Shaw, F.R.S., on Fridays, at 3 P.M., beginning on Jan. 20th. This course is intended for advanced students of the University and others interested in the subject. Admission is free, by ticket obtainable on application to the Meteorological Office, South Kensington, London, S.W. 7.—At University College, Gower-street, two lectures on the University of London, its History, Present Resources, and Future Possibilities, will be given by Sir Gregory Foster on Feb. 6th and 20th, at 5.15 P.M., and one on Administrative Measures for the Improvement of the Public Health, by Mr. A. G. R. Foulerton, on Feb. 13th, at 5.15 P.M.; also four lectures on the Evolution of Man, by Prof. G. Elliot Smith, F.R.S., on Fridays, Feb. 3rd, 17th, 24th, and March 3rd, at 5 P.M. An inaugural lecture entitled Matter, Mind, and Man, by the Rev. F. A. P. Aveling, D.Sc., will be delivered on Friday, Jan. 20th, at 5.30 P.M., in the Department of Psychology of King's College. Admission to these lectures is free without ticket.

The Gilchrist Studentship for Women. This scholarship, value £100, is tenable for one year by a graduate of the University who must take a course of study in an approved institution in preparation for some profession. Applications must reach the Principal Officer not later than Feb. 28th.

The Academic Council of the University have received from the Dean of the London Hospital Medical College an intimation that admission to the College and to the Hospital will in future be limited to men students.

UNIVERSITY OF LEEDS.—The Council of the University of Leeds has decided to proceed to the appointment of three whole-time tutors—one on the medical side and two on the surgical side of the Infirmary—to assist in the supervision of the students and in the organisation of the teaching under the direction of the members of the honorary staff. The union between the University and the Infirmary is happily so intimate that the fact that the work of these three officers will be almost entirely at the latter raises no difficulties. For several years there have been two part-time tutors, usually young aspirants to positions on the honorary staff, but part-time appointments involve obvious limitations in work of this kind. Suitable men to hold the newly-created full-time tutorships will probably be found among those who have held senior resident appointments at the Leeds General Infirmary; but the appointments will be open, and outside men will be appointed should no suitable local candidates present themselves. Tutors will be paid at the rate of £500 per annum, which, with the scheme of life insurance applying to all members of the staff who receive remuneration at a rate exceeding £300 per annum, will involve for the University an expenditure of £1650. The payment of a lecture attendant and the provision of some extra clerical assistance will add another £250; moreover, each department has had allotted to it an annual sum of £100 for apparatus. There is to be no attempt in Leeds to form "teaching units." An important part of the work of the tutors will be to take in hand junior men as soon as feasible after they pass their examinations in anatomy and physiology. Their hospital work will be under the direction of the tutors only during their preliminary clerkship, when they will study the methods of clinical investigation, physical signs, urine testing, case-taking, and so forth. In subsequent work students will continue to have the assistance of the tutors, but care will be taken to secure to the latter time for research. Both on the medical side and on the surgical side there is to be a diminution in the number of systematic lectures. A general course on medicine will be preserved, given as hitherto by the professor of medicine. The clinical teaching on the medical side will be accessory to this course of about 50 lectures; on the surgical side it will almost entirely replace it. On both subjects in addition short courses of lecture demonstrations will be given by different members of the staff. Care will be taken to guard against undue overlapping, and students will be able to get an extensive and varied course of illustrated lecture demonstrations during their three years of hospital study. In the preparation for these courses the honorary staff will get much help, it is hoped, from the tutors, who will act as liaison officers between the various classes. It is hoped the institution of these new tutorships will enable men who are regarded as likely to come upon the staff to intercalate a few years of invaluable work and exceptional opportunities of fitting themselves to serve the hospital in an honorary capacity and to increase its reputation as a teaching centre.

THE M.A.B. AND RESIDENTIAL TREATMENT OF TUBERCULOSIS.—The Metropolitan Asylums Board has recently been in communication with the London County Council on the subject of residential treatment of tuberculous patients. The Board has asked the Council to utilise fully the Board's accommodation before availing itself of beds provided in voluntary institutions—viz., hospitals, sanatoriums, and so on. The Public Health Committee of the Council has, however, arrived at the conclusion that retention of a considerable amount of hospital and sanatorium accommodation is essential. The Council's improved method of selection of cases for residential treatment depends on the provision of observation beds. These beds have been reserved at Brompton Hospital and at the Victoria Park Chest Hospital, which, in the opinion of the Committee, possess the best available facilities for highly skilled expert diagnosis. With regard to institutions to which patients are sent after coming under observation, certain necessary kinds of provision are made only in voluntary institutions, as, for example, those reserved for Roman Catholics or Jews. It is necessary also to make provision for treatment of patients under particular climatic conditions, such as those at Ventnor and Bournemouth, and voluntary institutions afford the only means at present available in that direction for obtaining further knowledge of the influence of climate in the treatment of the disease. In addition, great advantage is derived from the use of sanatoriums linked to hospitals, as is the case with Frimley Sanatorium and Brompton Hospital. For these reasons the Public Health Committee is of opinion that it may be difficult for the Council to utilise fully the accommodation at the disposal of the Asylums Board, and has suggested to the Board that they should consider the possibility of admitting patients from outside the County of London. Whatever arrangements it may be possible to make, the Committee will refrain from sending to the Asylum Board's institutions patients who can be accommodated in institutions better suited to their special needs. The Committee desires in particular to continue to make use of the exceptional facilities afforded by Brompton Hospital and its linked sanatorium at Frimley. The Council has, however, instructed the Committee "to coöperate to the fullest extent with the Metropolitan Asylums Board for the utilisation of accommodation provided at the request of the Council in institutions of the Board."

MIDDLESEX HOSPITAL MEDICAL SCHOOL.—An Emeritus lecture will be delivered on Friday, Jan. 20th, at 3 P.M., by Sir James Kingston Fowler on Diagnosis.

ROYAL INSTITUTION OF GREAT BRITAIN.—The last of the Christmas lectures on Electric Waves and Wireless Telephony, by Prof. J. A. Fleming, F.R.S., will be delivered on Jan. 10th, at 3 o'clock, on Wireless Telephony.

HARVEIAN SOCIETY OF LONDON.—The annual meeting will take place on Jan. 12th, at 8.15 P.M., at the rooms of the Medical Society, 11, Chandos-street, Cavendish-square, London, W., when Dr. G. de Bec Turtle, the retiring president, will give an address. This will be followed by a smoking concert.

RONTGEN SOCIETY.—A general meeting will be held on Tuesday, Jan. 10th, at 8.15 P.M., in the Institution of Electrical Engineers, Savoy-place, Victoria Embankment, London, W.C. 2, when a paper on the Structure and Dimensions of Molecules will be read by Prof. A. O. Rankine, D.Sc. The fifth "Silvanus Thompson Memorial Lecture" will be delivered by Sir Oliver J. Lodge, F.R.S., at a special meeting of the society to be held in March. It is hoped to devote the February meeting of the society to a series of short papers and demonstrations of apparatus. Those who wish to read papers or show apparatus at this meeting are requested to communicate with the hon. secs., Mr. E. A. Owen, D.Sc., the National Physical Laboratory, Teddington, Middlesex, or Dr. Russell J. Reynolds, 140, Harley-street, London, W. 1, before Jan. 14th.

LONDON HOSPITAL MEDICAL COLLEGE.—A special course of instruction for post-graduates in the work of school clinics and on diseases of children will be held this session beginning on Wednesday, Feb. 1st, when an introductory address will be delivered at 3.30 P.M. by Sir George Newman. The syllabus includes a course on general welfare, consisting of lectures on minor infantile diseases and clinical demonstrations, by Dr. C. H. Miller; a course on diseases of the ear, nose and throat, including special lectures on the common ailments, and on preventive measures, clinical demonstrations, operative instruction in the removal of enlarged tonsils and of adenoids, and in paracentesis, by Mr. F. F. Muecke; a course on diseases of the eye, including disease of lids and conjunctiva, refractions, and strabismus, by Mr. C. B. Goulden; a comprehensive course on common diseases of the skin, by Dr. J. H. Sequeira, including microscopical examination in hair scales for tinea and instruction in X ray treatment of ringworm. In addition, three lectures will be delivered by Dr. C. J. Thomas on the hygiene of schools, and visits will be paid to school buildings. A limited number will be admitted to the course which will extend over six months. The fee is 20 guineas, and certificates of efficiency will be issued at the end of the course which is intended for school medical officers and others. Applications for admission should be forwarded to the Dean, Prof. William Wright, at London Hospital Medical College, Mile End, London, E.

BETHLEM ROYAL HOSPITAL.—The syllabus of a course of lectures and practical instruction for the Diploma in Psychological Medicine granted by the various universities to be held this session has been issued. Part A will consist of lectures and demonstrations on the Anatomy, Histology, and Physiology of the Nervous System, by Dr. S. A. Kinnier Wilson, Dr. C. Worster-Drought, Dr. F. C. E. Danvers-Atkinson, and Dr. Clement Lovell; and lectures and demonstrations on Psychology by Dr. William Brown and Dr. W. H. Rivers Rivers, F.R.S. Part B includes lectures and demonstrations on Neurology by Dr. Kinnier Wilson, Dr. Worster-Drought, Dr. Danvers-Atkinson, and Dr. Clement Lovell; also lectures with clinical demonstrations on Psychological Medicine by Dr. E. D. Macnamara, Dr. W. H. B. Stoddart, Dr. R. Hunter Steen, Dr. J. G. Porter Phillips, Dr. Thomas Beaton, Sir Maurice Craig, and Dr. H. E. Wingfield; and a course of lectures with clinical demonstrations on Mental Deficiency by Dr. A. R. Tredgold. Fees for the full course will be £15 15*s.*, and for each part separately £10 10*s.* The course will begin at the end of January, and the lectures and demonstrations will be given and the practical instruction carried out according to a time-table which may be obtained with a detailed syllabus and any other information on application to the Physician-Superintendent, Bethlem Royal Hospital, London, S.E. 1.

RUNCORN SMALL-POX HOSPITAL.—At a recent meeting of the Runcorn Rural Council it was decided to dispense with the cost of maintenance of their present small-pox hospital at Moore, and to accept the proposal of the Warrington Corporation offering accommodation at Sankey Small-pox Hospital should the need arise. Runcorn's share of the cost of maintenance would amount to £85 per annum.

CHURCH MISSIONARY SOCIETY.—The title of the official magazine of the Medical Mission Auxiliary of the Church Missionary Society, which for 25 years has been known as *Mercy and Truth*, has now been changed to the *Mission Hospital*, in order to indicate more clearly the nature of its contents, and to secure a wider circulation in colleges and hospitals. The first issue under the new designation is dated January, 1922, and contains, in addition to the usual information concerning the medical work of the society in various parts of the world, an editorial note to the effect that 32 doctors and 25 nurses are urgently needed to raise the hospital staffs to the minimum requisite of efficiency. £52,000 were collected at home for medical missions in the last financial year, and £72,000 were earned in the mission fields by various efforts to render hospitals self-supporting.

MEDICAL SOCIETY OF LONDON.—The syllabus of the second half of the 149th session has just been issued. Jan. 9th will be devoted to a pathological evening. On the 23rd papers will be read by Dr. F. J. Poynton and Dr. J. W. McNee on a Case Resembling Leukæmia, but Presenting Unusual Clinical and Pathological Features, with specimens and microscopic slides; by Mr. T. H. Kellock on a Method of Treating Abscesses; and by Dr. W. Broadbent on Observations on Heart Disease. On the 30th the first Lettsomian lecture will be delivered by Sir Leonard Rogers, F.R.S., on Amœbic Liver Abscess: Its Pathology, Prevention, and Cure, subsequent lectures being held on Feb. 8th and 20th at the same time. On Feb. 13th Prof. Henri Hartmann, of Paris, will lecture on Inflammatory Strictures of the Rectum. On the 27th a discussion on the Treatment of Tuberculous Glands will be introduced by Mr. G. Grey Turner, to be followed by Sir Lenthal Cheatle, Mr. W. H. Clayton-Greene, Mr. Warwick James, and Mr. W. G. Howarth. On March 13th Dr. E. W. Goodall will read a paper on the Differential Diagnosis of the Common Exanthemata, with lantern and epidiascope illustrations. On May 8th the second general meeting will be held, followed by the annual oration by Mr. H. J. Waring, and subsequently by a conversazione. The ordinary meetings will be held at 8.30 P.M., the general meeting at 8 P.M., and the Lettsomian Lectures at 9 P.M. On the occasion of clinical meetings patients will be in attendance at 8 P.M. The anniversary dinner will be held at the Wharncliffe Rooms, Hotel Great Central, on March 8th, 1922. Further information may be obtained from the hon. secretaries, Mr. H. W. Carson and Dr. C. E. Lakin, at 11, Chandos-street, Cavendish-square, London, W.

DONATIONS AND BEQUESTS.—Under the will of Mrs. Elin Maria Melville, widow of Mr. William Melville, of Aberdeen, the following institutions will benefit: Aberdeen Royal Infirmary, Aberdeen Morningfield Hospital, Aberdeen Dispensary and Maternity Hospital, Royal Aberdeen Hospital for Sick Children, each £3000; Aberdeen Asylum for the Blind, Aberdeen Deaf and Dumb Benevolent Society, each £500. The employees of the Great North of Scotland Railway Company have agreed to distribute £704 3*s*. 10*d*., which had been collected at the various stations, among charitable institutions in Aberdeen and the north as follows: Aberdeen Royal Infirmary, £584 3*s*. 10*d*.; Royal Aberdeen Hospital for Sick Children, £40; Convalescent Hospital, Cults, and Gray's Hospital, Elgin, each £25; Chalmer's Hospital, Banff, and Turner's Memorial Hospital, Keith, each £15; Aberdeen Eye Institution, £10.—Sir Squire Bancroft, in memory of his late wife, has endowed a bed in the Chelsea Hospital for Women which will be known as the Lady Bancroft Bed.—The late Mr. David Howell James, J.P., of Beechcroft, Abergavenny, Mon., has left by will £3500 to the town council of Llandovery for or towards the erection of a cottage hospital at Llandovery, the female ward to be known as the "Elizabeth Ann James Ward," and £100 to the Victoria Cottage Hospital and Dispensary, Abergavenny.—Under the will of the late Mrs. S. A. Bescorby, of East Retford, Notts, the testatrix gives £5000 to her executor for distribution among such charities as he may select, and £1000 to the Retford Hospital, £250 each to St. Dunstan's Home for Blinded Soldiers and Sailors, the Society for the Prevention of Cruelty to Animals, the Society for the Prevention of Cruelty to Children, Dr. Barnardo's Homes, the Cancer Hospital, Fulham-road, the Cancer Research Society, the Jessop Hospital for Women, Sheffield, and the Royal Hospital for Incurables, Putney.—The late Mr. C. J. Lambert, of Westerham-hill, Kent, has bequeathed £1000 each to the Dreadnought Hospital, Greenwich, and to Dr. Barnardo's Homes.

SOCIETY FOR THE STUDY OF INEBRIETY.—The next meeting will be held in the Rooms of the Medical Society of London, 11, Chandos-street, Cavendish-square, London, W., on Jan. 10th, at 4 P.M., when Dr. C. F. Harford will open a discussion on Racial Aspects of Alcoholism with Special Reference to the Coloured Races.

NATIONAL COLLEGE OF TEACHERS OF THE DEAF.—At the last meeting of the executive of this College Mr. Macleod Yearsley and Dr. Kerr Love were unanimously elected vice-presidents of the College, in recognition of their work among the deaf and the valuable assistance they have rendered the College for many years past.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART.—A post-graduate course will be held during January, February, and March, when special courses of systematic lectures and clinical demonstrations will be given. The clinical practice of the hospital, both in the wards and in the out-patient department, will be open to post-graduate members of the course, who are also eligible for appointments as clinical assistants. The first of a course of lectures to be held on Mondays at 5.30 P.M. will be on Jan. 16th, when Dr. R. O. Moon will speak on Rheumatic Infection of the Heart. Subsequent lectures will be announced in our Medical Diary. Attendance at the lectures only is free to all qualified practitioners. A fee of £2 2*s*. per month, or £5 5*s*. for three months, is charged for the post-graduate course. All inquiries should be addressed to the Dean, Dr. P. Hamill, at the hospital, Westmoreland-street, London, W. 1.

THE LATE DR. G. S. BRADY, F.R.S.—On Christmas Day Dr. George Stewardson Brady died at his residence in Sheffield, aged 90. The son of a surgeon, Dr. Brady qualified M.R.C.S. and L.S.A. from the Durham College of Medicine in 1853. He started practising in Sunderland in 1857 and became physician to the Sunderland Children's Hospital and surgeon to the Durham and Northumberland Girls' Reformatory and Industrial Schools, and up to the time of his death remained consulting physician to the Sunderland Infirmary. Dr. Brady's main interests were scientific and his numerous publications include several monographs on the ostracoda. He became M.D. in 1876 at St. Andrews, a LL.D. in 1889, while the University of Durham awarded him an honorary D.Sc. in 1898. Dr. Brady was professor of natural history at Armstrong College, Newcastle, from 1875 to 1906, when he was made honorary professor. Since this time Dr. Brady has lived a retired life and has devoted himself to his hobbies of gardening and photography in so far as his health permitted.

THE ALBANY CLINICAL INSTITUTE, HASTINGS.—A clinical institute for the treatment of diabetes, gout, arthritis, anæmia, heart and arterial disorders, bronchitis, and tropical diseases will be opened at Hastings on Jan. 23rd. The advisory medical committee is strong; it includes Lord Dawson of Penn, Sir Charlton Briscoe, Dr. J. Mitchell Bruce, Dr. E. P. Cumberbatch, Dr. Leonard S. Dudgeon, Mr. Herbert L. Eason, Dr. A. M. Gray, Dr. C. E. Lakin, Sir W. Arbuthnot Lane, Dr. E. Graham Little, Mr. Herbert Tilley, Dr. W. Aldren Turner, Sir Cuthbert Wallace, Dr. S. Edward Wallis, Sir William Willcox, and Dr. S. A. Kinnier Wilson. The staff will consist of Dr. A. Hope Gosse, visiting physician; Dr. Wathen E. Waller and Dr. Leslie B. Hartley, resident physicians; Dr. Frank Bawtree, bacteriologist; Mr. A. R. Palmer, B.Sc., pathological chemist; and Mr. W. B. Lyth, secretary. The Albany Clinical Institute is being opened, in response to the suggestion of a number of leading consultants, to provide an institute within easy reach of London for the scientific treatment of disorders of metabolism, the cardio-vascular system, and so forth, at moderate inclusive terms. No case of infectious disease, tuberculosis, mental disorder, alcoholism or drug habit will be admitted. The dietetic treatment will be on the lines of the scientific treatment adopted at Duff House, Banff, and similar first-class establishments on the Continent. The treatment will include laboratory investigations and other tests necessary to control the dietary. On application for admission, patients will be requested to obtain the approval of their own practitioner, who will be informed by special report of the treatment adopted, in order that he may be able to continue it at home with such modifications as he may think wise. His coöperation will be welcomed at any time. The fee will be from 12 guineas to 18 guineas per week upwards, according to room, and includes board and residence, medical treatment, special diets, analytical work, and baths, as prescribed by the physician. The fee also includes ordinary nursing; an extra charge will be made when patients require special nursing. Surgical operations are not included. A few small rooms will be available for patients at lower rates but will not be offered except at the request of a physician. The Albany Clinical Institute is situated on a quiet and sheltered part of the Hastings and St. Leonards front.

Appointments.

ADIE, W. J., M.B., Ch.B. Edin., M.R.C.P. Lond., has been appointed Assistant Physician to the National Hospital for the Paralysed and Epileptic.

COATES, V., M.D., B.C. Cantab., Visiting Physician (Tropical Diseases), Ministry of Pensions Hospital, Bath; Honorary Physician to Royal Mineral Water Hospital, Bath.

MARLIN, T., M.D. Glasg., D.P.H., D.M.R.E., Assistant Electro- and Physio-Therapeutist to the Middlesex Hospital.

Vacancies.

For further information refer to the advertisement columns.

Bath, Royal Mineral Water Hospital.—P.
Bedfordshire County Council.—Asst. County Tub. O. £500.
Birmingham, Ministry of Pensions, Orthopædic Centre.—Res. Surg. O. £300.
Birmingham University.—Prof. of Anatomy. £1000.
Brighton, Royal Sussex County Hospital.—H.S. £175.
Canterbury, Kent and Canterbury Hospital.—Res. M.O. £171. Also Hon. Ophth. Surg.
Chartham Mental Hospital, near Canterbury.—Second Asst. M.O. £350.
Deptford Metropolitan Borough.—Asst. M.O. £500.
Derby, Derbyshire Royal Infirmary.—H.S. and Asst. H.S. and Cas. O. Each £200.
Dudley, Guest Hospital.—Res. M.O. and Asst. Res. M.O. £270 and £150 respectively.
Hellingly, Sussex, East Sussex County Mental Hospital.—Jun. Asst. M.O. £350.
Hospital for Consumption, &c., Brompton.—H.P. £50.
Kensington and Fulham General Hospital, Earl's Court.—Res. M.O. £200.
Leeds Public Dispensary.—Sen. Res. M.O. £250.
Lincoln County Hospital.—Jun. H.S. £150.
Liverpool, Royal Children's Hospital.—Hon. Asst. S.
Manchester, Ancoats Hospital.—Res. Surg. O. £250.
Manchester Union.—Res. Asst. M.O. £350.
Miller General Hospital, Greenwich-road.—H.P. £150.
Nottingham General Hospital.—H.S. £200.
Richmond Royal Hospital.—Hon. P.
Rochdale Infirmary and Dispensary.—Jun. H.S. £200.
Romford Union.—Res. M.O. £500.
Sheffield Royal Infirmary.—Cas. O. and H.S. £150.
Southampton Free Eye Hospital.—H.S. £150.
Victoria Hospital for Children, Chelsea.—H.P. and H.S. £100 each.
West End Hospital for Nervous Diseases, 73, Welbeck-street.—M.O.
Westminster Hospital, Broad Sanctuary.—Asst. S.'s. and Asst. H.P.

The Chief Inspector of Factories, Home Office, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Girvan, at Shaw, and at Redditch (Worcester).

Births, Marriages, and Deaths.

BIRTHS.

BEATH.—On Dec. 26th, 1921, at "Elmwood," University-road, Belfast, the wife of Dr. Maitland Beath, of a daughter.

GRAHAM MARTIN.—On Dec. 23rd, 1921, at Princes-road, Liverpool, the wife of Colonel J. Graham Martin, M.D., T.D., A.M.S. (T.A.), of a son.

PLATT.—On Dec. 21th, 1921, at Buckingham-crescent, Victoria Park, Manchester, the wife of Harry Platt, M.D., M.S., F.R.C.S., of a daughter.

POOLE.—On Christmas Day, 1921, at South Wigston, near Leicester, the wife of Frank S. Poole, M.R.C.S., L.R.C.P., of a daughter.

REES.—On Christmas Eve, 1921, at Swanage, Dorset, the wife of Dr. W. A. Rees, of a son.

SYMONDS.—On Dec. 27th, 1921, at Wimpole-street, W., the wife of Dr. C. P. Symonds, M.D., of a son.

MARRIAGES.

MACKEAN—MARSHALL.—At St. Giles' Cathedral, Edinburgh, on Dec. 29th, 1921, by the Very Reverend A. Wallace Williamson, D.D., C.V.O., Dean of the Thistle, Robert Mackintosh Mackean, M.B., Ch.B., Estroyle House, Shaw-street, Liverpool, son of Mr. and Mrs. William Mackean, Aftonplace, Motherwell, to Winifred Margaret, eldest daughter of Mr. John Marshall, Education Officer for Stirlingshire, and Mrs. Marshall, Dunard, Stirling.

STEDMAN—BARMBY.—On Jan. 2nd, Percy Stedman, M.B. Lond., M.R.C.S., L.R.C.P. Lond., D.P.H., to Margaret Barmby.

DEATHS.

BISHOP.—On Dec. 31st, 1921, at West Tanfield, R. W. S. Bishop, M.R.C.S., L.R.C.P., aged 56 years.

BOSWORTH.—On Dec. 28th, 1921, at Ballincourt, Bexhill-on-Sea, John Routledge Bosworth, M.R.C.S., L.R.C.P., aged 76 years.

CLARK.—Passed away on Christmas Eve, 1921, at Kingston Hill, Dr. Tom Clark, late of Westbourne-street, Eaton-square.

CLAY.—On Dec. 24th, 1921, at Wembury House, Plymstock, S. Devon, Robert Hogarth Clay, M.D., in his 86th year.

COOK.—On Dec. 25th, 1921, at Hayes-road, Clacton-on-Sea, John Will Cook, M.D., M.R.C.S., aged 85 years.

HOWSE.—On Dec. 27th, 1921, suddenly, at Minehead, Percy William Macdowall Howse, F.R.C.S. Eng., of Lyndford House, Reading.

LEYDEN.—On Dec. 23rd, 1921, of pneumonia, at Holly Lodge, Brockley, Dr. Charles Dominic Leyden.

O'BRIEN.—On Dec. 29th, 1921, at Dewstead, Instow, Colonel Joseph O'Brien, I.M.S., aged 77 years.

O'KEEFFE.—On Dec. 23rd, 1921, at Queen's-road, Richmond, Thomas Francis O'Keeffe, Surgeon Commander, R.N., retired, aged 47 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

Tuesday, Jan. 10th.

THERAPEUTICS AND PHARMACOLOGY: at 4.30 P.M.
Informal Meeting: "Tea, Talk, and Tobacco."

PSYCHIATRY: at 8.30 P.M.
Paper:
Dr. R. G. Rows: The Application of Modern Methods in the Treatment of Psychoses.

Thursday, Jan. 12th.

NEUROLOGY: at 8.30 P.M.
Paper:
Sir Frederick Mott and Dr. Uno (communicated by Sir Frederick Mott): The Changes in the Brain in Cases of Surgical Shock.

Friday, Jan. 13th.

CLINICAL: at 5.30 P.M. (Cases at 5 P.M.)
Exhibition of Cases.

OPHTHALMOLOGY: at 8.30 P.M. (Cases at 8 P.M.)
Cases:
Mr. Humphrey Neame: Congenital Abnormality; Branching Remnants of Persistent Hyaloid Vessels.
Other cases will be shown.
Papers:
Mr. Malcolm L. Hepburn: Experience Gained from 150 Trephine Operations for Glaucoma.
Mr. Humphrey Neame: Epibulbar Leucoma with Intraocular Involvement.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.
MONDAY, Jan. 9th.—8.30 P.M., Pathological Evening.

HUNTERIAN SOCIETY, Sion College, Embankment, E.C.
WEDNESDAY, Jan. 11th.—9 P.M., Second Lecture by Mr. Walter G. Spencer: Some Local Results of Dental Infection.

HARVEIAN SOCIETY OF LONDON, 11, Chandos-street, W.
THURSDAY, Jan. 12th.—8.15 P.M., Annual General Meeting: Dr. G. de Bec Turtle will deliver the Presidential Address on Some Points on Spasm in the Alimentary Tract.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE SPECIAL POST-GRADUATE COURSE: Jan. 9th to Feb. 18th.
MONDAY, Jan. 9th.—10 A.M., Hospital for Consumption and Diseases of the Chest. 1.15 P.M., St. George's Hospital: Dr. Donaldson: Post-mortem Demonstrations.
TUESDAY.—10 A.M., Chelsea Hospital for Women: Mr. Victor Bonney: Operations and Demonstrations on the Treatment of Prolapse. 2 P.M., Hospital for Consumption and Diseases of the Chest.
WEDNESDAY.—10 A.M., Chelsea Hospital for Women: Mr. Aubrey Goodwin: Demonstration of Pathological Specimens. 2.30 P.M., St. Peter's Hospital: Mr. J. Swift Joly: *Lect.*, Calculous Disease of the Urinary Organs.
THURSDAY.—10 A.M., Hospital for Consumption and Diseases of the Chest. 2 P.M., Chelsea Hospital for Women: Mr. L. C. Rivett: Demonstration in Out-patient Department.
FRIDAY.—10 A.M., Chelsea Hospital for Women: Mr. F. L. Provis: *Operat. and Lect.*, X Ray Therapy in Gynæcology. 2 P.M., Hospital for Consumption and Diseases of the Chest.
SATURDAY.—11.30 A.M., Western Hospital, Fulham: Dr. R. M. Bruce: Selected Cases of Infectious Diseases. 2 P.M., Hospital for Consumption and Diseases of the Chest.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.
MONDAY, Jan. 9th.—5 P.M., Dr. Arthur Saunders: Catarrhal Jaundice.

TUESDAY.—5 P.M., Mr. Banks Davis: Some Common Affections of the Throat.
WEDNESDAY.—5 P.M., Dr. Simson: Modern Developments in the Management of Labour.
THURSDAY.—5 P.M., Dr. W. McC. Wanklyn: Small-pox Diagnosis in Relation to the Practice of General Medicine. (Its great importance, the minimum requisite to know about it, and how to remember that easily.)*
FRIDAY.—5 P.M., Mr. Banks Davis: Chronic Catarrhal Deafness.
Daily:—10 A.M., Visit of Post-graduates to Wards. 2 P.M., In-patient, Out-patient Clinics and Operations.
*Open to all medical practitioners.

ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN, 49, Leicester-square, W.C.
THURSDAY, Jan. 12th.—6 P.M., Chesterfield Lecture. Dr. W. Knowsley Sibley: Electrical Treatments. Diathermy, &c.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE CLINIC.
TUESDAY, Jan. 10th.—4.30 P.M., Mr. C. Roberts: Surgery of the Spleen.

ST. MARY'S HOSPITALS POST-GRADUATE LECTURES, at Whitworth-street West Branch, Manchester.
FRIDAY, Jan. 13th.—4.30 P.M., Dr. Donald: Puerperal Sepsis.

SALFORD ROYAL HOSPITAL, Manchester.
THURSDAY, Jan. 12th.—Dr. Corsar Sturrock: Hypothyroidism.

ROYAL INSTITUTE OF PUBLIC HEALTH, 37, Russell-square, W.
A Course of Lectures on Tuberculosis and Public Health in the Lecture Hall of the Institute.
WEDNESDAY, Jan. 11th.—4 P.M., Dr. H. Hyslop Thomson: The Organisation and Administration of a Tuberculosis Service.

THE LANCET: SUBSCRIPTION RATES.

INLAND	One Year	£2	2	0
	Six Months	1	1	0
	Three Months	0	10	6
ABROAD	One Year	£2	10	0
	Six Months	1	5	0
	Three Months	0	12	6

Subscriptions may commence at any time and are payable in advance. Cheques and P.O.'s (crossed "London County Westminster and Parr's Bank, Covent Garden Branch") should be made payable to THE MANAGER, THE LANCET Offices, 423, Strand, London, W.C. 2.

ADVERTISEMENT RATES.

Books and Publications .. ..
Official and General Announcements
Trade and Miscellaneous Advertisements .. .. } Four Lines and under 6*s.* 0*d.*
Every additional line, 1*s.* 6*d.*
Quarter Page, £3. Half a Page, £6. Entire Page, £12.
Special Terms for Position Pages.

DOVER PUBLIC HEALTH COMMITTEE.—At the December meeting of the Public Health Committee the question of rebuilding the fever hospital aroused discussion. It was contended that the building and formation of the present hospital rendered its upkeep expensive, and a suggestion was put forward that the rebuilding should be done in sections, one section a year, the new buildings to be of brick with central heating. The question of a site was also discussed. Dr. A. B. McMaster, medical officer of health, stated in reply to a question that there was no danger of infection when the buildings of a hospital were at the distance from the boundary laid down by the late Local Government Board. Some of the buildings in the present fever hospital, he continued, were not sufficiently removed from the boundary. The only trouble if the hospital were rebuilt on its present site would be if small-pox patients were admitted; that was why Dover small-pox cases had to be taken to the borough isolation hospital at Poulton. If the rebuilding scheme went forward to the County Council for building grants it would be brought before the Ministry of Health, and an inquiry would be held; sanction for the scheme would depend on whether the Ministry took the same view towards reconstruction of an existing hospital as towards construction of an entirely new hospital. After further discussion the surveyor was directed to confer with the medical officer of health concerning plans for reconstruction. Dr. McMaster later replied to queries relating to the case of small-pox recently reported in the borough. He was still following up his inquiries, and there was no source of infection in the town. All lodging-houses had been closely examined and contacts had been re-vaccinated; he was satisfied that the infection had arisen from some casual person coming into the town and going out again.

Notes, Short Comments, and Answers to Correspondents.

VENTILATION AND EFFICIENCY IN FACTORIES.

A Chadwick Trust Lecture delivered at Blackburn on Oct. 27th, 1921,

BY LEONARD HILL, M.B. LOND., F.R.S.,
DIRECTOR, DEPARTMENT OF APPLIED PHYSIOLOGY, NATIONAL INSTITUTE FOR MEDICAL RESEARCH.

THE wild animal which survives in the struggle for existence enjoys perfect fitness and health. On the other hand, civilised man requires a volume to contain the list of diseases from which he suffers. Not only wild but domestic animals—horses, cattle, sheep, swine—do well on an open-air existence; they are far more subject to disease when closely confined in stalls. Stock breeders have not been successful in their use of artificial heat for the raising of stock, except in the case of young chickens hatched in incubators. The experience of keepers of zoological gardens has led them to extend the opportunities for open-air life given to animals brought from tropical countries. Man, evolved some million years ago, has immense inborn power of resisting cold. The experience of shipwrecked people, and of citizen-soldiers exposed to the utmost rigours of weather in the trenches, shows this power. The soldiers in the recent war, well fed, clothed, and exercised, but at times wet, chilled, and exhausted, were, compared to the civilian population at home, exceptionally free from respiratory catarrh. Wild men, such as the Fuegians, stand exposure to most inclement weather with scanty or no clothing and no houses or artificial heat. They practise infanticide to keep the population down to the food-supply, and, like wild animals, shelter in thickets or caves, where, owing to wind and temperature difference between their bodies and the atmosphere, there is free exchange of air.

The experience of open-air schools and sanatoriums show that life spent largely in the open benefits the health of those subject to catarrhs or tuberculosis, those with over-nervous temperament, heart weakness, &c. By exposure to sun and moving air, slum children—splinted and naked, with heads shaded—are cured of tuberculous, spinal, and joint diseases; their muscle tone and appetite improve, and they become darkly pigmented like Indians, the pigment warding off sunburn. The Japanese have carried out their wonderful development of artistic excellence in craftsmanship in slightly built dwellings with the aid, in cold weather, of nothing but charcoal braziers to warm their hands at, depending on clothes and exercise to keep their bodies warm. On the other hand, during the last century or so the endeavour of Europeans and Americans dwelling in the colder climates has been toward building draughtless houses and securing inside these by artificial heating a climate similar to that on a still, oppressive, warm summer day. The low cooling power of stagnant air of rooms artificially heated decreases the body heat production to a low level. Instead of the body being kept warm naturally by the stimulation of cool air exciting muscular exercise and glandular activity and so enhancing the combustion of food, it is kept warm by the blanketing effect of warm stagnant air, so that sedentary occupations can be carried on, and amusements and rest taken in comfort with a minimum of open-air muscular exercise.

The Necessity of Exercise.

The body is fashioned by nature for the getting of food by active exercise, and upon the taking of such exercise depends the proper vigorous function of the digestive, respiratory, and vascular organs. Consequent on this, too, is the vigour of the nervous system and the keen enjoyment of life. So, too, the healthy state of joints, muscles, and ligaments, and freedom from rheumatic pains depend upon proper exercise of the body, neither over use nor under use, either of which may be associated with malnutrition and lowered resistance to infection. The hothouse conditions of life suitable for the failing powers of the aged, the injured in a state of shock, and those in the last stages of wasting disease are mistakenly supposed to be suitable for the young and healthy. The traditional fear of cold is handed down from mother to children at her knee. For fear of their "catching cold," many are confined indoors and over-clothed. They are debilitated, and at the same time exposed to massive infection in crowded places. Man, with his erect posture, has to withstand the influence of gravity which weighs down his viscera and tends to make his blood and body fluids sink to the lower parts. This

influence is naturally resisted by the tone of the muscles, skin, and other membranes which by confining the body prevent over-distension of dependent parts, and by muscular exercise, such as walking and the consequent deep breathing, which together pump the blood back from the capillaries and veins to the heart, and at the same time most effectually massage the abdominal viscera. Such massage keeps the circulation active through the bowels, liver, &c., and helps those movements of the bowels which further the proper digestion and absorption of food and prevent constipation. Unnatural bacterial fermentations, with consequent poisoning, arise in the bowels from lack of exercise, particularly in those who indulge in the pleasures of the table, and take food which is not absorbed and utilised. In others appetite is reduced by the sedentary indoor life, and constipation and dyspepsia result with a condition of deficient feeding and the debilit of the semi-starved. The deep breathing excited by exercise not only furthers the circulation and activity of the bowels, liver, &c., but secures the proper functioning of an adequate blood stream through all parts of the lungs.

Out of doors the skin is cooled and dried by the wind and water is evaporated from it—the wind freely ventilating the clothes. The skin is also warmed by the radiant energy of the sun, and this, too, actively causes evaporation. The wind and sun affect the flow of water from lymph and blood through the skin, the wind cools the blood in one part, the sun warms it in another, the shorter sun rays act chemically on the white skin, as evidenced by sunburn and pigmentation. There is reason to think that the skin is a great seat of production of immune substances which protect us against infection. Exposure of the skin to sun and wind has a profound effect upon it, and through it on the health of the body. Cool winds ensure the removal of the body heat by convection, and keep the cutaneous vessels constricted so that the blood is driven in greater volume through the viscera; the sun's warmth dilates the cutaneous vessels, enhances the flow through the skin, and excites transpiration and perspiration. These to-and-fro changes of the skin's condition make for health. The monotonous life spent in an environment of overwarm, stagnant, and moist air entangled in their clothes when people are confined in rooms, often crowded, is contrary to those naturally changing conditions which pertain out of doors.

Respiration.

The air breathed into the lungs, whatever be its content of moisture or its temperature, is breathed out approximately at body temperature and saturated with moisture at this temperature. What matters to the skin and respiratory membrane is not the relative humidity, but the actual vapour pressure of the air which comes in contact with it. Cold saturated air is excessively dry when warmed up to body temperature, and takes up much moisture from the body; warm saturated (or even half-saturated) air takes up far less. The vapour pressure of saturated air at 20° C. is 0·96 mm. Hg: at −10° C., 2·16; at 0° C., 4·58; at 10° C., 9·21; at 20° C., 17·54; at 30° C., 31·83; at 35° C., 42·2; at 40° C., 55·3. A cubic metre of air holds approximately as many grammes of water when saturated as shown by the vapour pressure figures just given. The breathing of cool air entails, then, much greater evaporation from the respiratory membrane and consequent greater flow of lymph through and secretion of fluid from it. The membrane is better washed and kept clean from infecting microbes by such outflow. The breathing of cold air entails, too, a greater flow of arterial blood through the membrane in order to keep it warm, and at the same time warm the inhaled air. Vigorous open-air exercise may increase the volume breathed five times, and this on a cold day means far more blood, lymph, and secretion fluid washing the respiratory membrane. The open-air worker is thus better protected, while he escapes the massive infection from "carriers" which occurs in shut-up rooms. It is the bronchitic with chronic inflammation and those with acute catarrh who should not expose themselves to the change of atmosphere between room and wintry out of doors; but what suits the bronchitic, and those in the state of "chill" from infectious catarrh, must not be taken as suitable for the healthy.

For them dryness of cold air is not trying, for them the Alpine resorts are most bracing and health-giving. In the sirocco in Palestine the relative humidity sinks to 2 per cent., the temperature being 43° C. In the Alpine winter midday the physiological saturation deficit—that is, the difference between the vapour pressure of the air and the vapour pressure of the air saturated at body temperature—may be even lower, owing to the small amount of vapour held in the air at the low temperature there pertaining.

One gramme of water evaporated takes away 600 calories of heat; hence it follows that cooling by evaporation from breathing passages and skin is very effectual, but this must fail in *saturated* atmospheres at temperatures at or near to body temperature. In hot, dry atmospheres the sweating mechanism may become exhausted, especially in the sick—e.g., those suffering from constipation, malaria, &c. In such a case a wet sheet put over the body, and a fan set to blow on this, prevents heat-stroke in a hot, dry atmosphere by setting up an artificial evaporation. A hot, dry wind may heat the body by convection more than it can be cooled by the evaporation of sweat; to prevent this effect Arabs, in a sandstorm, crouch on the desert and cover themselves with their robes.

Effect of Moist, Warm Climates on Efficiency.

Moist, warm atmospheres are very trying and reduce the efficiency of workers because of the difficulty of getting rid of body heat, particularly when the air is stagnant; the layer of air entangled in the clothes then becomes saturated and raised to skin temperature. The ventilation of factories and work-places in general is thus a matter of great importance in the light of this close relation between fresh, cool air and health and efficiency.

The bad effect of such a warm, moist climate as that of Singapore on the British is established by experience. Every four years a year's leave has to be given (in a temperate climate) to re-establish the health of officials, and this is not enough, for inability to withstand the climate is frequent. The native Malays, I am informed, are incapable of strenuous effort, such is the racial debilitating effect of the climate; Indians and Chinese are brought in to do the heavy work. The basal metabolism of an Englishman at rest, and fasting, averages 40 calories per kg. of body weight per hour, that of a Brazilian in Rio de Janeiro 30 calories. The university student of athletic habit eats daily food of the value of some 4000 calories; a Malay university student's diet has, according to Dr. Argyll Campbell, the value of about 1600 calories. To live comfortably in the tropics an Englishman must reduce his body weight, activity, and diet, and become pigmented so that he can go out with a loin cloth. Tropical shade conditions of climate are frequently found in tenement dwellings and workshops through stagnancy and over-heating of the air. Such conditions are ennervating. They may be balanced by open-air exercise in leisure hours; but if, as is the tendency to-day, leisure be spent in crowded conveyances, teashops, drinking-bars, cinemas, theatres, meeting-houses, almost the whole 24 hours of the day is spent in approximately tropical shade conditions. Spinning-mills and weaving-sheds have to be kept at a high state of humidity for the purpose of manufacture, and in these, by the introduction of hot steam, the climate is made to approximate to that of Singapore.

Disadvantages of Urban Life.

Sedentary occupation in still, warm atmospheres lowers the basal metabolism, slackens muscular tone, lessens appetite, causes constipation, makes shallow the breathing and slow the circulation, rendering the worker feeble in health and liable to consumption. The city life precludes him from outdoor games and gardening, and the want of gardens lowers the supply of fresh green foods and fruits which contain essential principles for growth and health—the vitamins. The man with a garden can profitably employ his spare hours in raising vegetables, poultry, rabbits, and keep a goat for milk, and thus enrich the diet of his family. The garden city makes for a happy, contented population.

It is most necessary in the cotton industry that conditions should be kept as far as possible good for both workers and yarn, and that the workers should have ample opportunity for and training as children in the necessity of balancing their hours of employment by outdoor exercise and sleeping in rooms with the windows open. The expectation of life in infancy is much higher in purely agricultural districts than in manufacturing cities—e.g., that of females in Westmorland is 61 years, in Middlesbrough 46. At the age of 15 the same difference is 5½ years. The death-rate has a definite relationship to crowding.

In 1901–10 the urban mortality (standardised rates) was for males 134 per cent. and for females 132 per cent. of rural mortality. For 30 years from 1881 the country dwellers have maintained this advantage, in spite of all the efforts of sanitary authorities in cities. In the medical grading of recruits for the army in 1917, over 70 per cent. of coal-miners—men who do strenuous work in well-ventilated atmospheres with good pay and holidays—were graded 1, against 20 per cent. in a sample of cotton operatives. It may be said that the best of the cotton operatives had voluntarily enlisted earlier in the war, but that will scarcely explain the whole story.

Dr. M. Greenwood, statistician to the Ministry of Health, has furnished me with figures (Tables I. and II.) showing the higher mortality—both general and from phthisis—of certain operatives. The Fall River (U.S.A.) figures show not only environmental but racial differences: a population "unsalted" to factory life suffers much more highly.

TABLE I.—*Comparative Mortality—(A) All Causes. (B) Phthisis.*

1. Clergy. 2. Agricultural labourers. 3. Cotton operatives. 4. Shoemakers in Northants and Leicester. The figures between parenthesis indicate deaths per 1000.

—	Ages 25–35		35–45		45–55		55–65	
	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)
1	100 (2·17)	100 (0·66)	100 (3·15)	100 (0·67)	100 (7·62)	100 (0·59)	100 (21·92)	100 (0·58)
2	147 (3·20)	151 (1·00)	156 (1·90)	165 (1·09)	107 (8·12)	167 (0·98)	79 (17·32)	148 (0·87)
3	177 (3·86)	199 (1·32)	208 (6·52)	236 (1·56)	199 (15·13)	349 (2·07)	169 (36·90)	416 (2·43)
4	249 (5·39)	539 (3·54)	250 (7·83)	566 (3·74)	163 (12·42)	508 (3·00)	120 (26·13)	384 (2·23)

TABLE II.—*Fall River. Death-rate per* 1000 *among Operatives aged* 15–44.

Causes of Death.—1. Tuberculosis. 2. Non-tuberculous. 3. All causes.

—	All operatives.		Spinners.		Irish. (All operatives.)		All other races. (All op.)	
	M.	F.	M.	F.	M.	F.	M.	F.
1	2·47	3·34	3·35	4·21	5·59	4·97	2·15	2·98
2	3·10	4·33	3·92	4·70	4·33	6·46	2·97	3·78
3	5·57	7·67	7·27	8·94	9·92	11·43	5·12	6·76

M., Male. F., Female. All op.—All operatives.

At Fall River the death-rate for males between the ages of 15 and 45 is 104 per cent., and for females 207 per cent., above the standard. The physical labour of cotton-spinning is not great: "the most striking physical features of the spinning-room are the heat and moisture of the atmosphere." The comparative mortality of potters from phthisis and other respiratory diseases is two to three times greater than that of other males living in the district; this fact is partly due to pottery dust and partly, I believe, to the heat and lack of ventilation of the potters' shops.

In the matter of efficiency it has been shown by Dr. A. J. Orenstein and Mr. H. J. Ireland that in the South African mines where the ventilation is worst as measured by the kata-thermometer (presently to be described), the efficiency of native workers, measured on an ergograph, is 50 per cent. less than where the ventilation gives a cooling power up to my standard. These authors estimated that the efficiency of the whole mine was down 21 per cent. through defective ventilation. Dr. H. M. Vernon found that in tinplate factories the output was reduced 10–13½ per cent. in July and August from its value in December and January in badly ventilated factories, and only 3 per cent. in a factory where large fans above the heads of the workers made an effectual cooling draught.

By means of the respiratory exchange I measured my heat production when walking a mile in 16 minutes along the sands of the seashore in the recent warm October sunny days, first when clothed with trousers, pants, socks and boots, shirt, sweater and coat; secondly, in bathing dress. The breathing apparatus carried on my back weighed 21 lb. In the first case the walk was a task—I was uncomfortable and poured with sweat, and looked forward to its end. In the second case the walk was easy and enjoyable; the second walk was done a minute faster, but the heat production was less. The body temperature taken in the arm-pit was in the first case 98° F., in the second case 96·5°. The pulse-rate at the end of the walk was 150 in the first case and 122 in the second. In the first case the heart had to beat quickly to supply not only the muscles for walking but the skin for sweating; it is the rapid rate of the heart which contributes to the feelings of fatigue. People with heart disease stand hot rooms badly, and employers must see to it that their workers are cooled so that the energy of the heart is not wasted on cooling the body.

The New York Commission on Ventilation conducted tests of optional work in a chamber, giving a small cash bonus for the work done. They found 63 per cent. more typewriting done at 68°F. than at 75°, and of a heavier type of physical work 15 per cent. more at 68° than at 75°, and 37 per cent. more than at 86°. Of 215 records of temperature in New York 73 per cent. were over 73° and 29 per cent. over 80°; the loss of efficiency must, then, be enormous. Physiological research has shown that the physical, not the chemical, properties of the air are responsible for the feeling of good health and vigour which results from fresh atmosphere. Natural ventilation arising from differences of temperature is such within rooms and workshops that the percentage of oxygen or of carbon dioxide is never decreased to such an extent as to make the least physiological difference to us. We naturally regulate our breathing so that the percentage of carbon dioxide in the depths of the lung is kept at about 5 per cent. A few parts more or less per 10,000 have no effect, and even 0·5 to 1·0 per cent. in the atmosphere only deepens the breathing a little so that the natural percentage in the lungs is kept constant (J. Haldane).

The weight of oxygen breathed in in each pint of air is much less at the famous Alpine health resorts than it is in the worst ventilated room, owing to the diminution of barometric pressure and thinning of the air at mountain altitudes. This fact shows that the effect of bad ventilation is not due to want of oxygen. The stuffy smell of badly ventilated rooms is unpleasant, but there is no evidence of an organic chemical poison being exhaled by human beings, and all the feelings of stuffiness may be removed from the people in such a room by cooling the air and fanning it without purifying it. The air of crowded, ill-ventilated rooms is grossly contaminated with microbes and dust particles—the microbes coming from carriers of disease—e.g., those with "catarrhs" (common colds), consumption, &c.—spread these diseases. A big dose of such microbes often repeated is much more likely than a small dose to beat down the body's defences. Dusty atmospheres gradually choke the lungs and produce a chronic asthma in late middle life; carding-room operatives and flax hecklers, for example, have so suffered. Some dusts are poisonous and produce degeneration of the lungs and consumption; such is free silica dust which comes from quartz, sandstone, gritstones, flint, and ganister. Thus the phthisis death-rate is very high in gold- and tin-miners, granite and sandstone workers, and grinders. Coal dust excites the respiratory membrane to cleanse itself and seems innocuous. To keep down microbes the volume of fresh air passed through any workshop should be kept high. Captain S. R. Douglas and I found that open windows or fan extraction had a notable effect on removing from a room a spray of microbes. To keep down dust the machines used in processes that give off dust must be provided with ducts and fans for extraction, and wet cleaning used in place of dry. A wet spray is used in the South African gold mines, but this intensifies the humidity and requires to be balanced by movement of the air, so as to keep the workers cool. So, too, in spinning-mills and weaving-sheds the warm humidity requires to be balanced by movement of the air, or devices introduced for locally damping the yarn without general humidification of the air.

Determination of Temperature by Wet and Dry Bulb Thermometers.

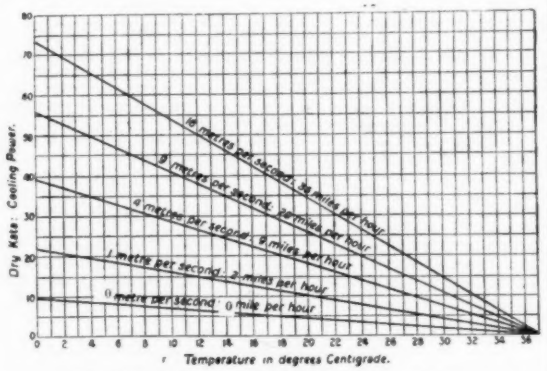
The atmospheric conditions which prevail in cotton-weaving sheds is at present determined by means of wet and dry bulb thermometers. The Factory and Workshop (Cotton Cloth Factories) Act, 1911, gives the permissible maximum limits of humidity of the atmosphere for different temperatures, and the manager of a humid shed regulates the amount of artificial moisture introduced in accordance with these instruments. The wet and dry bulb thermometers, however, fail to indicate the effect of movement of the air which has a most powerful effect on the cooling of the body by convection and evaporation of sweat. We know how relief is gained on a close day by a fan, or in a train with the window open. So long as the dry bulb temperature is below that of the skin the body can be cooled by convection currents, but above body temperature it is warmed by convection currents. So long as the wet bulb temperature is below that of the skin the body can be cooled by evaporation, and wind is most potent in removing the layer of warm saturated air from the skin and bringing cooler, drier air to it. With a wet bulb above body temperature the cooling of the body either by convection or evaporation is impossible, and heat-stroke results so soon as the body temperature rises above the limits possible for the life of the living tissues. With a dry bulb temperature above and wet bulb below body temperature cooling depends on sweating, and air movement must be enough continually to take away the warm, saturated layer of air from this skin. Clothes and confinement in stagnant air greatly impede the taking away of the layer. The stripping off of clothes and fans greatly help evaporation and cooling of the body in warm humid conditions. For people clothed and indoors the wet bulb temperature should not rise above 60° F.; one over 70° is uncomfortable, and one over 75° against efficiency of work. At 80° wet bulb Haldane found a miner's work fell off, and at 85° was scarcely possible. J. L. Bruce says comfortable conditions are indicated better by the dew-point than by the wet-bulb, and that with a dew-point round about 62° work can be carried out without incon-

venience, even when the wet and dry bulbs are very high—e.g., 111° and 82°, with dew-point 66°. On the other hand, with dry bulb 90°, wet bulb 81°, dew-point 74·5, efficient mental or physical work was practically impossible. The movement of the air—e.g., set up by the sun heating the ground—no doubt was much less on the second occasion, which was probably a still cloudy day. It is important to bear in mind sources of radiant heat, such as the sun on a roof, or coming through a skylight or window on to a worker, or furnace heat. The wet and dry bulbs hung in the centre of a shop may fail to indicate the effect of such, just as they fail to indicate the cooling power of wind. I find the surface temperature of a piece of black fur, taken by gently stroking it with the bulb of a thermometer, is a good guide to the radiant heat absorbed by the body. Thus on a calm sunny day the temperature of the air may be 22°, and that of the black fur surface over 50°. Another excellent indicator of ventilation is the surface temperature of the cheek. I stroke the cheek with the bulb of the thermometer (a self-registering one made for me by J. Hicks, of 8, Hatton-garden, London, E.C.), rotating the bulb at the same time. Out of doors on cool days in the wind the cheek temperature may be anything from 70–85°, according to the cooling power of the wind. On close days and indoors it is from 90° to 98°. Sweating prevents it going higher, except at first when exposed, say to the sun, and while the skin is still dry. Factories should be kept so that the cheek temperature is near 90°.

The Katathermometer.

To get some measure of the cooling and evaporative powers of the air exerted on the body, I have introduced the katathermometer, a large-bulbed spirit thermometer of standard size and shape graduated at 100° and 95° F. (made by J. Hicks, of Hatton-garden). The bulb is heated in hot water in a Thermos flask until the meniscus rises into the small top of the bulb. It is then dried, suspended, and the time of cooling from 100° to 95° taken with a stop-watch in seconds. The number of seconds divided into a factor number (approximately 500 and determined for each instrument) gives the cooling power by convection and radiation on the surface of the "kata" at approximately skin temperature in millicalories per square centimetre per second. The operation is repeated with a cotton muslin finger-stall on the bulb and the wet "kata" cooling power obtained, a cooling power due to evaporation, radiation, and convection.

The difference between the two gives the evaporative cooling power. The "kata" indicates cooling and evaporative powers from its own surface, not from the human body. Its bulk is comparable to the body of a mouse, and is much smaller than the parts of a human body. The "kata"


Dry Kata: Cooling Power.
Temperature in degrees Centigrade.
10 metres per second. 36 miles per hour.
5 metres per second. 18 miles per hour.
2 metres per second. 7 miles per hour.
1 metre per second. 3 miles per hour.
0 metre per second. 0 mile per hour.

Relation of dry kata cooling power to wind.

Graph showing the dry "kata" cooling powers, expressed by the ordinates, which can be obtained by winds of various velocities at different air temperatures which are marked along the abscissa.

readings give valuable measures of cooling and evaporative powers, but not direct measures of the cooling and evaporative loss of the body. In Britain the mean dry "kata" cooling power on the top of observatories is from 20 to 25 in July and August and about 40 in December and January. Extensive observation shows that the dry "kata" cooling power is about 6 in ordinary rooms not feeling close and occupied by sedentary workers. It certainly should not be less than 6 excepting under conditions of outside temperature which make it impossible to secure such a cooling power by means of fan ventilation. It is frequently found to be as low as 4 and even 3 in factories and offices when proper attention to ventilation would easily secure readings of 6. Valuable researches have been carried out by the Industrial Fatigue Research Board into the atmospheric conditions of boot and shoe, pottery, and printing-shops, and laundries. In hot weather last summer readings below 2 were obtained in some of these shops, readings far lower than those taken out of doors.

The researches carried out by myself, and recently and more fully by Mr. S. Wyatt for the Industrial Fatigue Research Board on spinning-mills and weaving-sheds, have shown that my standard readings, 6 dry "kata," 18 wet "kata," are seldom reached. During the winter the average readings are approximately 5 and 15. During the summer the readings are much below the standard, and the conditions are against vigorous health and should be remedied. The evaporative power of the air is so reduced by the admission of steam that sweating does not give adequate relief, and the workers and their clothes become sensible damp. The considerable differences in the cooling power of the air which exist in different sheds show that this is, within limits, under control of the management. The differences are largely due to the quantities of steam forced in.

Machine movements appreciably increase the cooling power of the air by stirring it; the to-and-fro movements of the spinner in front of the loom help to cool him. Mr. Wyatt finds that the air movement in the vicinity of the weaver can be effectively increased by attaching a 3-inch strip of canvas to the heald roller on the loom; this inexpensive device maintains a cooling power above my standards, and its effect is quickly shown by reduction of surface temperature of the cheek. The operatives should be provided with dressing-rooms, and should change into light clothing suitable for the tropical atmosphere in which they work; they can then come and go from home in dry clothing. When moderate physical work is being done the reading should be higher than 6—say, 7–9—and even more when heavy labour is being performed. By keeping the cooling power in proper relation to the work done and heat output of the worker—four times as much energy is spent by the body in heat as in doing external work—the latter can be kept from sweating, and working with comfort and ease he will be naturally stimulated to greater output.

At a large steel tube drawing factory clusters of large air ducts have been installed over the heads and to the side of the workers in front of the furnaces. The air current from these is so great that when the furnace doors are shut one feels too cold and moves away. The men are alternately warmed by radiant energy and cooled by wind as they draw the tubes from the furnace or pause; the effect is as congenial as the sun on a breezy day coming in and out from white clouds. The output here is very good and there is no industrial unrest. A great improvement in health and efficiency should follow the general application of proper cooling power to the work in hand.

The output of different classes of workers is exemplified by the estimates given in Table III.

TABLE III.

(A) Additional k. cal. per hour required for work.

Man.	(A)	Woman.	(A)
Tailor	44	Seamstress	6
Bookbinder	81	Typist	24
Shoemaker	90	Sewing machinist ..	24–57
Carpenter	116–164	Bookbinder	38–63
Metal worker ..	141	Housemaid	81–157
Painter	145	Washerwoman ..	124–214
Stonemason ..	300		
Man sawing wood ..	378		

I have calculated that the tailor would require a dry "kata" cooling power of 6, the carpenter 8–10, the stonemason 15, and the man sawing wood 18 to prevent sweating.

Conclusion.

An extensive series of observations on people sitting in ordinary clothes indoors or outdoors exposed to the wind shows that the metabolism is correlated very closely with the dry "kata" cooling power. The cheek temperature varies greatly with exposure—e.g., from, say, 35°C. in overwarm factories, 33°C. in factories which do not feel close, to 20°C. or even lower out of doors exposed to cold winds. The cheek temperature, also, has a close relation to the metabolism when people are exposed out of doors to cool conditions. Exposure to cold wind may double the metabolism of a man sitting at rest. His natural inclination is not to sit still and feel chilled but be active and keep himself warm. It is to this impulsion to activity and raising of metabolism that open-air life largely owes its beneficial effect.

A research now being carried out by Dr. Argyll Campbell and myself in conjunction with Sir Henry Gauvain on cases of surgical tuberculosis treated by exposure to sun and open air confirms this point of view.

USEFUL HEALTH PROPAGANDA:

CONTROL OF DIPHTHERIA IN CHICAGO.

IN a recent *Bulletin* of the Chicago School of Sanitary Instruction, of which the motto is "Sanitary Instruction is Even More Important Than Sanitary Legislation," appears the following advice and information concerning diphtheria, the Schick test, and toxin-antitoxin immunisation. This has been drawn up by the Diphtheria Commission, named by the Commissioner of Health, Dr. John Robertson Dill, as part of an effort now being made to bring diphtheria under control and to effect a saving of child life.

Diphtheria in Chicago in the Ten-Year Period, 1911–1920.

73,582 cases, one per year in each 331 inhabitants.

8167 deaths, one per year in each 2033 inhabitants.

During the ten-year period before antitoxin was introduced, one person in each 650 inhabitants of Chicago died each year from diphtheria.

Of 10,060 cases of diphtheria, 3776 were in children under school age and 4270 during school age.

Of 270 deaths from diphtheria, 185, or 64·8 per cent., were in children between 1 and 5 years of age, and 248, or 91·8 per cent., between 1 and 10 years of age.

Diphtheria is the leading cause of death in children between 6 and 10 in Chicago.

The Schick Test.

Used to determine susceptibility or immunity to diphtheria. Consists in intracutaneous injection of a minute amount of diphtheria toxin in the right arm with control injection of same material, but after having been heated to destroy the toxin in the left arm. The results become apparent after three or four days and are classed as follows:

(*a*) Positive, indicated by red area, 1–2 cm. in diameter, with slight infiltration on right arm; no change on left arm.

(*b*) Positive Combined, larger area of redness on right arm with smaller area of redness on left arm.

(*c*) Negative, no reaction on either arm.

(*d*) Negative Pseudo, equal area of redness on both arms, reaching height as a rule in 24 hours and usually faded by fourth day.

Results (*a*) and (*b*) indicate susceptibility to diphtheria; results (*c*) and (*d*) indicate immunity.

The Schick test has nothing to do with treatment or production of immunity.

Per cent. of children susceptible to diphtheria at various ages as shown by Schick test (Zingher):—

2–4 years	32·2%	10–12 years	21·4%
4–6 "	25·7%	12–14 "	17·7%
6–8 "	21·8%	14–16 "	16·4%
8–10 "	22·6%		

The proportion of susceptible children is greater among the well-to-do and in the country than among those living in the crowded parts of cities; among the former it may be as high as 85 per cent.

Toxin-Antitoxin Immunisation.

This consists in the subcutaneous injection three times at intervals of one week of a mixture of a small quantity of diphtheria toxin almost completely neutralised by antitoxin. The quantity injected each time is 1 c.cm. In children below 5 years of age toxin-antitoxin may be injected without a preliminary Schick test; in children over 5 years of age toxin-antitoxin should be injected only in those that give a positive Schick test.

The reaction from toxin-antitoxin injections varies much, being almost absent in children up to 5 years of age. There may be local redness, swelling, and tenderness with some fever and headache for 24 to 72 hours, but no lasting ill-effects follow injections of properly prepared mixtures. Of 11,878 children given the first injection by the Chicago Health Department, 5919 (49·82 per cent.) gave no reaction; 5105 (18·98 per cent.) gave a slight reaction; 791 (6·66 per cent.) gave a moderate reaction; and 63 (0·54 per cent.) gave a severe reaction. In over 50,000 injections by the New York City Health Department in 1921 there was not a single serious result.

Following the injections immunity develops in the majority during the second month; in a few it requires six months. This immunity lasts usually more than five years and probably a great deal longer.

Illustrations.

Of 570 institutional children, 90 to 95 per cent. were immune at the end of two years (Schroeder, New York). Of 317 children, 310 (97·7 per cent.) were immune eight months after the injection, and of 79 between 2 and 9 years of age, all were immune after eight months (Byard Private Practice). In Durand Hospital, Chicago, of 31 nurses injected, 24 were immune within three months (Mulsow). The New York City Health Department furnishes the following figures for 529 children.

Table Showing 529 Immune Children.

Doses (1 c.cm.) of toxin-antitoxin.	Number of children.	Number immune 3 months after injection.	Per cent. immune after 3 months.
1	239	175	73
2	89	80	90
3	201	191	95

In all these examples the fact of immunity was determined by negative Schick tests. Toxin-antitoxin injection is useless in the treatment of diphtheria and in the production of immediate immunity. In children known to be exposed to diphtheria, immediate temporary protection should be secured with antitoxin. Toxin-antitoxin is not a substitute for antitoxin. It prevents diphtheria by gradually inducing immunity.

Note upon the Statement.—It should be noted that "immune" in this American statement means "giving a negative Schick reaction." Strictly speaking, the immunity of a group of children to diphtheria is demonstrated only by showing that few or none of them contract the disease when exposed to infection. There is not yet sufficient experience to be quite sure that a negative reaction necessarily means immunity in this sense, but there are substantial grounds for thinking that the two terms are practically synonymous.

THE RED CROSS IN INDIA.

IN a 75-page pamphlet entitled "World's Welfare," Dr. Dhanjibhai H. Mehta, medical officer at Baroda, has described the foundation and development of the Indian Red Cross Society and its affiliation with the International League of Red Cross Societies. At the outbreak of war in 1914 India was the only belligerent country which had no voluntary machinery for dealing with the enormous volume of work which speedily devolved upon Red Cross organisations, and the late Sir Pardey Lukis established a society on the lines of the British Red Cross Society. This new society he combined with the already existing St. John's Ambulance Association in India; the committee in charge of the work was naturally largely official in character until the great rally of popular support which followed upon the Viceroy's appeal in December, 1917. In 1918, under the chairmanship of Sir Claude Hill, the committee was reconstituted, non-official Indian members being added; the methods of administration were altered to admit of more autonomy for the provincial branches. India became able to pay for all Red Cross work within her own borders, and to assist Red Cross operations in Mesopotamia, Egypt, Palestine, East Africa, and other countries in which Indian troops were employed. After the Armistice it was decided—with the approval of the British Joint Committee, of which the Indian Committee was technically a branch—to devote the capital sum remaining to the credit of the Indian Committee to the purposes for which it was originally contributed, but to spend the interest accruing from that sum in civil work during peace-time. In February, 1919, Sir Claude Hill represented India at the inauguration of the International League of Red Cross Societies; in March, 1920, he brought before the Imperial Legislative Council the Indian Red Cross Society Bill, constituting the Society on a wider basis and with a wider purpose. Dr. Mehta includes in his pamphlet the full text of the Bill and a résumé of the work of the International League of Red Cross Societies up to the present time, concluding with an appeal for the support of all classes of the population in India and for the establishment of branches of the Indian Red Cross Society throughout the country.

W. O.—Much depends upon the actual length of the stump. If the amputation was actually at the junction of upper and middle thirds of the ulna, measuring from the tip of the olecranon, the stump in the average man would be only 3½ in. long and would afford no useful hold for an artificial forearm. It would then have to be treated as a through-elbow case. If, however, there is a stump measuring 5 or 6 in. from the tip of the olecranon and the patient wants a good useful prosthesis, a Williams arm, such as the chief arm instructor, Captain Maxwell, himself prefers, would be best. This arm is made in London by Blatchford and Co., 90, Clapham-road, S.W. 9, and at Dunvant, near Swansea, by T. and W. Williams, Goitre-road. If the stump is 6 in. or more and a hand with mechanical thumb is wanted, the McKay arm (P. M. McKay, 218, Blackfriars-road, London, S.E. 1), or a strong but light arm of Cory and Grundy (Cory and Grundy, Ltd., 384, Wandsworth-road, London, S.W. 8), is to be recommended. If, as a master-mariner, the patient has much to do with compasses, and masses of steel are therefore objectionable, the arm last-named can be made of duralumin and composition.